

**Volume III
Remedial Investigation
Walker Property Site
Santa Fe Springs, California**

**Appendix D - Global Gas Chemistry Report - Fuel
Fingerprinting**
Appendix E - Biotreatability Report
Appendix F - Groundwater Analytical Results
Appendix G - Air Analytical Results
Appendix H - Analytical Data Validation

Prepared for

Texaco Inc.
10 Universal City Plaza
Universal City, California 91608-1097

HLA Project No. 32538 4

August 25, 1995



Harding Lawson Associates
Engineering and Environmental Services
3 Hutton Centre Drive, Suite 300
Santa Ana, CA 92707 - (714) 556-7992

APPENDIX D

APPENDIX D

GLOBAL GAS CHEMISTRY REPORT - FUEL FINGERPRINTING



DRAFT

Global Geochemistry Corporation

CHEMICAL CHARACTERIZATION OF PETROLEUM HYDROCARBONS IN FIVE (5) SOIL SAMPLES COLLECTED FROM THE WALKER PROPERTY SITE IN SANTA FE SPRINGS, CALIFORNIA

HARDING LAWSON ASSOCIATES
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

HOSSEIN ALIMI, SHAN-TAN LU

June 21, 1994

Global Geochemistry Corporation
6919 Eton Avenue
Canoga Park, California 91303
(818) 992-4103 FAX (818) 992-8940

DRAFT

**CHEMICAL CHARACTERIZATION OF PETROLEUM HYDROCARBONS
IN FIVE (5) SOIL SAMPLES COLLECTED FROM THE WALKER PROPERTY
SITE IN SANTA FE SPRINGS, CALIFORNIA**

prepared for:

HARDING LAWSON ASSOCIATES
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

prepared by:

HOSSEIN ALIMI, SHAN-TAN LU

June 21, 1994

DRAFT

TABLE OF CONTENTS

I. INTRODUCTION

II. ANALYTICAL METHODS

- II.1 Total Petroleum Hydrocarbons (TPH)
- II.2 Solvent Extraction
- II.3 Gasoline Range (C_3-C_{10}) Hydrocarbons
- II.4 C_{8+} Alkane Gas Chromatography of Soil Extracts
- II.5 Gas Chromatography-Mass Spectrometry of Soil Extracts

III. RESULTS AND DISCUSSION

- III.1 Total Petroleum Hydrocarbons (TPH)
- III.2 Gasoline Range (C_3-C_{10}) Hydrocarbons
- III.3 Solvent Extraction and C_{8+} Alkane Gas Chromatography of Soil Extracts
- III.4 Fuel Type Characterization Using Detailed Gas Chromatography-Mass Spectrometry

IV. CONCLUSIONS

LIST OF TABLES

- Table 1: Results of TPH (EPA 418.1) analysis performed on soil samples submitted by Harding Lawson Associates.
- Table 2: Results of gasoline range (C_3-C_{10}) hydrocarbon analysis performed on samples submitted by Harding Lawson Associates.
- Table 3: Total extract contents of soil samples analyzed.
- Table 4: Key for bicyclanes (m/z 123 fragmentograms).
- Table 5: Key for tricyclic, tetracyclic and pentacyclic terpanes identification (m/z 191 fragmentograms).
- Table 6: Key for steranes identification (m/z 217 fragmentograms).
- Table 7: Key for identifying aromatic hydrocarbons.

LIST OF FIGURES

- Figure 1: C_3-C_{10} gas chromatogram of a procedural blank (CS_2 extract).

DRAFT

- Figure 2: C₃-C₁₀ gas chromatogram of sample RS16 (0.5-1').
- Figure 3: C₃-C₁₀ gas chromatogram of sample RS16 (20-20.5').
- Figure 4: C₃-C₁₀ gas chromatogram of sample RS14 (1-1.5').
- Figure 5: C₃-C₁₀ gas chromatogram of sample RS14 (1-1.5') (duplicate).
- Figure 6: C₃-C₁₀ gas chromatogram of sample RS17 (5.5-6').
- Figure 7: C₃-C₁₀ gas chromatogram of sample RS15 (15.5-16').
- Figure 8: C₈₊ gas chromatogram of a procedural blank (methylene chloride solvent).
- Figure 9: C₈₊ gas chromatogram of a C₈-C₃₂ normal alkane standard mixture.
- Figure 10: C₈₊ gas chromatogram of sample RS14 (1-1.5').
- Figure 11: C₈₊ gas chromatogram of sample RS16 (0.5-1').
- Figure 12: C₈₊ gas chromatogram of sample RS16 (20-20.5').
- Figure 13: C₈₊ gas chromatogram of sample RS16 (20-20.5') (duplicate).
- Figure 14: C₈₊ gas chromatogram of sample RS17 (5.5-6').
- Figure 15: C₈₊ gas chromatogram of sample RS15 (15.5-16').
- Figure 16: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS15 (15.5-0').
- Figure 17: Mass chromatogram of n-alkanes (m/z 85) obtained from Bunker C oil.
- Figure 18: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS14 (1.0-1.5').
- Figure 19: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS16 (0.5-1').
- Figure 20: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS16 (20.0-20.5').
- Figure 21: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS17 (5.5-6').
- Figure 22: Mass chromatogram of alkylcyclohexane (m/z 83) obtained from sample RS15 (15.5-16').
- Figure 23: Mass chromatogram of alkylcyclohexane (m/z 83) obtained from sample RS17 (5.5-6').
- Figure 24: Mass chromatogram of alkylcyclohexane (m/z 83) obtained from Bunker C oil.
- Figure 25: Mass chromatogram of alkylcyclohexane (m/z 83) obtained from sample RS16 (0.5-1').
- Figure 26: Mass chromatogram of alkylcyclohexane (m/z 83) obtained from sample RS14 (1.0-1.5').
- Figure 27: Mass chromatogram of alkylcyclohexane (m/z 83) obtained from sample RS16 (20.0-20.5').

DRAFT

- Figure 28: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS17 (5.5-6').
- Figure 29: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS15 (15.5-16').
- Figure 30: Mass chromatogram of isoprenoids (m/z 113) obtained from Bunker C oil.
- Figure 31: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS16 (0.5-1').
- Figure 32: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS14 (1.0-1.5').
- Figure 33: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS16 (20.0-20.5').
- Figure 34: Mass chromatogram of bicyclanes (m/z 123) obtained from sample RS16 (20.0-20.5').
- Figure 35: Mass chromatogram of bicyclanes (m/z 123) obtained from Jet A.
- Figure 36: Mass chromatogram of bicyclanes (m/z 123) obtained from sample RS17 (5.5-6').
- Figure 37: Mass chromatogram of bicyclanes (m/z 123) obtained from sample RS15 (15.5-16').
- Figure 38: Mass chromatogram of terpanes (m/z 191) obtained from sample RS16 (0.5-1').
- Figure 39: Mass chromatogram of terpanes (m/z 191) obtained from sample RS16 (20.0-20.5').
- Figure 40: Mass chromatogram of terpanes (m/z 191) obtained from sample RS14 (1.0-1.5').
- Figure 41: Mass chromatogram of terpanes (m/z 191) obtained from sample RS17 (5.5-6').
- Figure 42: Mass chromatogram of terpanes (m/z 191) obtained from sample RS15 (15.5-16').
- Figure 43: Mass chromatogram of terpanes (m/z 191) obtained from Bunker C oil.
- Figure 44: Mass chromatogram of steranes (m/z 217) obtained from sample RS16 (0.5-1').
- Figure 45: Mass chromatogram of steranes (m/z 217) obtained from sample RS16 (20.0-20.5').
- Figure 46: Mass chromatogram of steranes (m/z 217) obtained from sample RS14 (1.0-1.5').
- Figure 47: Mass chromatogram of steranes (m/z 217) obtained from sample RS17 (5.5-6').
- Figure 48: Mass chromatogram of steranes (m/z 217) obtained from sample RS15 (15.5-16').
- Figure 49: Mass chromatogram of steranes (m/z 217) obtained from Bunker C oil.
- Figure 50: Aromatic hydrocarbon distribution pattern of sample RS16 (0.5-1').
- Figure 51: Aromatic hydrocarbon distribution pattern of sample RS16 (20.0-20.5').
- Figure 52: Aromatic hydrocarbon distribution pattern of sample RS16 (20.0-20.5') (duplicate)
- Figure 53: Aromatic hydrocarbon distribution pattern of sample RS14 (1.0-1.5').

DRAFT

Figure 54: Aromatic hydrocarbon distribution pattern of sample RS17 (5.5-6').

Figure 55: Aromatic hydrocarbon distribution pattern of sample RS15 (15.5-16').

Figure 56: Aromatic hydrocarbon distribution pattern of Bunker C oil.

APPENDICES

Appendix 1: Copies of Chain-of-Custody

Appendix 2: Gas chromatography quantitation reports.

DRAFT

I. INTRODUCTION

A total of five (5) soil samples from four borings drilled at the Walker Property Site in Santa Fe Springs, California were submitted to Global Geochemistry Corporation (GGC) by Harding Lawson Associates on May 20 and 24, 1994. The main objective was to perform a fingerprinting study to characterize the hydrocarbons and to determine fuel types in the soil samples supplied.

The samples submitted were identified as follows:

Sample ID	GGC ID	Collected from	Depth of Sampling (feet)	Date of Sampling
RS16 0.5-1	2462-1	Boring RS16	0.5-1.0	5/12/94
RS16 20-20.5	2462-2	Boring RS16	20-20.5	5/12/94
RS14 1-1.5	2462-3	Boring RS14	1.0-1.5	5/12/94
RS17 5.5-6	2462-4	Boring RS17	5.5-6.0	5/13/94
RS15 15.5-16	2462-5	Boring RS15	15.5-16.0	4/16/94

II. ANALYTICAL METHODS

II.1 Total Petroleum Hydrocarbons (TPH, EPA 418.1)

The soil samples were extracted with fluorocarbon -113 in a sonication bath. Interferences were removed with silica gel absorbent. Infrared analysis of the soil extracts was performed by direct comparison with standards.

II.2 Solvent extraction

The soil samples were extracted with methylene chloride (CH_2Cl_2) using sonication method. The extracts were concentrated and weighed.

II.3 Gasoline Range ($\text{C}_3\text{-C}_{10}$) hydrocarbon Gas Chromatograph

Detailed gas chromatography of the gasoline range ($\text{C}_3\text{-C}_{10}$) hydrocarbons of the samples was performed by injection of an aliquot of a CS_2 extract of the sample into a GC with a 100M Petrocol capillary column and

DRAFT

a Flame Ionization Detector (FID).

II.4 C_8+ Alkane Gas Chromatography

The distribution of the hydrocarbons heavier than octane (C_8) were determined by injection of 0.6 μ l of a 17 x dilution (in methylene chloride) of the samples into a GC with a 30M RSL-150 capillary column and an FID detector. The data were acquired using LabTech Notebook software, reduced and normalized plots of the chromatograms were produced.

II.5 Gas Chromatography-Mass Spectrometry of Soil Extracts

The distribution of the Polynuclear Aromatic Hydrocarbons (PAH) and saturated hydrocarbons were determined by injection of an aliquot of the diluted sample extracts into a Finnigan 9600 GC with a 60M DBI column and a Finnigan 4000 quadropole mass spectrometer.

The data were acquired and normalized bar diagrams of the PAH distributions and mass fragmentograms of selected key ions were produced.

III. RESULTS AND DISCUSSION

III. Total Petroleum Hydrocarbons (TPH)

The analysis for the total petroleum hydrocarbons (TPH) was performed on all five soil samples using EPA method 418.1. The results presented in Table 1 indicate that the samples submitted are enriched in TPH showing concentrations in the 360 μ g/g (RS16 0.5-1') to 9400 μ g/g (RS15 15.5-16'). The results in Table 1 also indicate that the soils collected from the deeper intervals (i.e. below 5') contain more TPH than those collected from shallower depth.

III.2 Gasoline range (C_5-C_{10}) Hydrocarbons

The soil samples were extracted with carbon disulfide (CS_2). A procedural blank shown in Figure 1 demonstrates that some impurities which respond to FID detector, are present in the CS_2 solvent giving those

DRAFT

unknown peaks in Figure 1. The results of the C₃-C₁₀ analyses performed are presented in Table 2, with the gas chromatograms of the extracts shown in Figures 2-7. The results in Table 2 indicate that no gasoline range hydrocarbons could be detected in four of the soil samples submitted, except for the deepest sample collected from RS16 (20-20.5') in which only hydrocarbons less volatile than ethylbenzene (compound #57, Table 2) are present. It is also apparent that in sample RS16 (20-20.5') all normal alkanes (i.e. n-nonane and n-decane) are depleted. The absence of volatile hydrocarbons, in samples investigated indicate that either (1) no light distillate product, e.g. gasoline is present or (2) the hydrocarbons present have been severely altered by water washing and biodegradation.

III. 3 C₈-Gas Chromatography of Methylene Chloride Extract of the Soils

To determine if higher molecular weight hydrocarbons are present, all five soil samples were extracted with methylene chloride and the extracts were concentrated. The results presented in Table 3 indicate that the soil samples submitted are rich in soluble hydrocarbons showing concentrations in the 2341 µg/g (or 0.23 wt%) to 20,978 µg/g (or 2.1 wt%) range. Among the samples analyzed, samples RS17 (5.5-6') and RS15 (15.5-16') appear to contain the highest extract contents (i.e. 20,978 and 17,154 µg/g respectively).

The extracts of the soils were injected onto a gas chromatograph equipped with a capillary column and FID detector. A procedural blank was prepared on the methylene chloride (Figure 8) showing that no peaks are present. An alkane gas chromatogram of a C₈-C₃₂ normal alkane standard mixture is presented in Figure 9. The alkane gas chromatograms of both shallower soil samples, i.e. RS14 (1-1.5') and RS16 (0.5-1.0') are very similar to each other (Figures 10 and 11 respectively), showing distribution patterns with a few peaks and a large hump appearing in the 30-70 minutes retention time range. The large hump in these samples probably represents polycyclic hydrocarbon compounds (possibly steranes and terpanes). Figure 10 and 11 also indicate that both the normal alkanes (straight chained paraffins) and the isoprenoids (branched alkanes) are not present in these samples. Alkane distribution patterns such as those shown in Figures 10 and 11 are typical of severely biodegraded heavy residual fuel products (e.g. Bunker C oil) or even crude oils.

The gas chromatograms of the extracts of samples RS16 (20-20.5') (Figures 12 and 13) and RS17 (5.5-

DRAFT

6') (Figure 14) show relatively similar alkane distribution patterns in which all normal alkanes have been removed and isoprenoids from iC₁₃ to phytane (Ph or iC₂₀) are present as the only identifiable peaks. The gas chromatograms in Figures 12-14 also show a big hump appearing in the 50-70 minutes retention time range, which probably represents high molecular weight cyclic compounds (biomarkers steranes and terpanes). Alkane gas chromatograms such as those in Figures 12-14 are characteristic of highly biodegraded heavy residual fuel oils (e.g. Bunker C oil), or even crude oils. However, the presence of a swarm of peaks in the 5-20 minutes retention time range in sample RS16 (20-20.5') (Figures 12 and 13), supported by the abundant iC₁₃ to iC₁₆ isoprenoids, probably indicates that in addition to the heavy fuel product a small amount of middle distillate product (e.g. kerosene and/or Jet fuels) is also present in this sample.

Hydrocarbons extracted from soil sample RS15 (5.5-16') (Figure 15) show a wide alkane distribution pattern in the range of C₁₄ up to C₃₁, with a large hump appearing in the 40-70 minutes retention time range. The relative abundances of the isoprenoids, supported by the absence of normal alkanes more volatile than C₁₄ provide evidence that hydrocarbons present in this soil sample are less altered (biodegraded) relative to those of other samples investigated. Alkane gas chromatograms such as that in Figure 15 is typical of moderate to severely altered (biodegraded) heavy residual fuels such as Bunker C oil.

III.4 Fuel Type Characterization Using Detailed Gas Chromatography-Mass Spectrometry (GC-MS)

To confirm the conclusions reached by the gas chromatography analysis and to identify the type of fuel products in the samples submitted, the extracts were further investigated using a detailed GC-MS analysis. The results of these analyses are discussed as follows:

N-alkanes, alkylcyclohexanes, isoprenoids, bicyclanes, terpanes and steranes.

The n-alkanes mass fragmentogram (m/z 85) of sample RS15 (15.5-16') (Figure 16) shows a wide alkane distribution pattern in the C₁₄ to C₃₆ range with a maximum at C₁₉. This indicates that hydrocarbons present in this sample (RS15) have undergone the least degradation relative to other samples analyzed. A comparison between the n-alkane distribution pattern of this sample and that of a Bunker C oil (Figure 17) indicates that

DRAFT

they are closely similar to each other, although C₉ to C₁₃ and probably a portion of the C₁₄-C₃₆ n-alkanes appear to have been removed from sample RS15 (15.5-16') due to evaporation and/or biodegradation. This finding suggests that the Bunker C oil is the main fuel product contaminated the soil collected from boring RS15.

Figures 18 to 21 show the n-alkane distribution patterns of samples RS14 (1-1.5'), RS16 (0.5-1'), RS16 (20-20.5') and RS17 (5.5-6') respectively. As shown in these figures, most of the normal alkanes (n-alkanes) have been removed and only a small amount of them have survived. Figures 20 and 21 show that most of the survived n-alkanes are in the range of C₂₉-C₃₅, because of their high molecular weight and their resistance towards biodegradation.

Samples RS15 (15.5-16') (Figure 22) and RS17 (5.5-6') (Figure 23) show alkylcyclohexane (m/z 83) distribution patterns very similar to that of a Bunker C oil (Figure 24), ranging from CH-2 (a cyclohexane with an ethyl side chain) to CH-12. This observation confirms that hydrocarbons extracted from samples RS15 and RS17 represent Bunker C oil. Due to the severe degradation, no alkylcyclohexanes were detected in the most shallow samples RS16 (0.5-1') and RS14 (1-1.5') (Figures 25 and 26). Furthermore, the alkylcyclohexane pattern (m/z 83) for sample RS16 (20-20.5') (Figure 27), is slightly different compared to those of samples RS15 and RS17 (Figures 22 and 23), showing relatively higher amounts of CH-3 to CH-5. This indicates that the deepest sample from boring RS16 (i.e. 20-20.5') may have been contaminated by a mixture of different products. Based on the alkylcyclohexane distribution pattern, we conclude that the extract of this sample (i.e. RS16 20-20.5') represents a mixture of Bunker C oil (main proportion) and a middle distillate product (such as jet fuel, possibly Jet A or kerosene).

As shown in Figures 28 to 30, the isoprenoid distribution pattern (m/z 113 mass fragmentograms) of samples RS17 (5.5-6'), RS15 (15.5-16') and the Bunker C oil are relatively similar to each other, illustrating a maximum at pristane (Pr) with phytane (Ph) being the next most abundant isoprenoid compound. The lower concentration of I-9 to I-18 (an isoprenoid compound with 18 carbon atoms) in sample RS17 (Figure 28) compared to that of sample RS15 (Figure 29) is probably attributed to the degradation effects because sample RS17 is collected at a shallower depth (5.5-6') where hydrocarbons have a higher tendency to be degraded by water washing and/or evaporation.

DRAFT

Hydrocarbons present in samples RS16 (0.5-1') and RS14 (1-1.5') (Figures 31 and 32) collected nearest to the surface, appear to have been severely degraded by water washing, evaporation and/or biodegradation. Consequently, only the most resistant isoprenoids pristane and phytane, as well as trace amounts of I-16 and I-18 have survived in both these samples.

A comparison between the isoprenoid distribution pattern of sample RS16 (20-20.5') (Figure 33) and that of a Bunker C oil (Figure 30) indicates that sample RS16 (20-20.5') contains a relatively higher concentration of I-14, I-15 and I-16. This finding confirms the above conclusion that hydrocarbons present in sample RS16 (20-20.5') represents a mixture of Bunker C oil and a middle distillate product (i.e. Jet fuel, possibly Jet A or kerosene).

The bicyclic (m/z 123) hydrocarbon distribution pattern of sample RS16 (20-20.5') (Figure 34, see Table 4 for key) is closely similar to that of a Jet A fuel (Figure 35). This similarity supports the latter conclusion that Jet fuel (possibly Jet A) is most probably also present in this sample. However, Figures 36 and 37 show bicyclane distribution patterns of samples RS17 and RS15, to be very similar to each other, but quite different from that of sample RS16 (20-20.5') (Figure 34).

Aliphatic biomarker (i.e. terpanes and steranes) distribution patterns of the soil extracts were also used to characterize the type products present. Terpanes and steranes are saturated polycyclic hydrocarbons which are most resistant to biodegradation. These biomarkers are commonly observed in crude oils, along with their middle to high temperature distillates such as Bunker C oil and waste oil, whereas they are absent in low boiling refined products e.g. gasoline, kerosene and Jet fuels.

A significant amounts of terpanes and steranes were detected in all five soil extracts investigated. The terpanes distribution patterns of the samples analyzed (Figures 38 to 42, see Table 5 for key) are closely similar to each other, showing a homologous series of hopanoid compounds, with a maximum at C_{30} $\alpha\beta$ -hopane (compound N), which is generally the most abundant triterpane and also the most resistant to degradation. The terpane distribution patterns of the samples investigated (Figures 38-42) are very similar to that of a Bunker C oil (Figure 43), indicating that Bunker C oil is the main product contaminating the soil samples submitted.

The sterane distribution patterns of all five samples analyzed (Figures 44-48, see Table 6 for key) are similar

DRAFT

to each other and match closely that of a Bunker C oil (Figure 49). This observation supports the earlier conclusion that the samples investigated have been largely contaminated by Bunker C oil. Furthermore, the $\alpha\beta\beta$ [$5\alpha(H), 14\beta(H), 17\beta(H)$] isomers of the steranes are more resistant to degradation than the $\alpha\alpha\alpha$ isomers. For example, the ratio of C_{29} , $\alpha\beta\beta/\alpha\alpha\alpha$ will increase with increasing degradation. The $\alpha\beta\beta/\alpha\alpha\alpha$ ratios calculated for samples analyzed are 0.47 (RS16, 0.5-1'), 0.35 (RS16, 20-20.5'), 0.42 (RS14), 0.39 (RS17) and 0.34 (RS15). By considering the relative high abundances of $\alpha\beta\beta$ -steranes, especially the C_{29} , $\alpha\beta\beta$ steranes (compound #18 and 19 in Figures 44-48 and high $\alpha\beta\beta/\alpha\alpha\alpha$ ratios of 0.47 and 0.42) in both shallower, i.e. samples RS16 (0.5-1') and RS14 (1-1.5') it is evident that hydrocarbons in these samples have suffered the most degradation.

Polynuclear Hydrocarbons (PAH)

The relative abundances of aromatic hydrocarbon compounds in the five soil samples from borings RS16, RS14, RS17 and RS15 are shown as bar diagrams in Figures 50-55 (see Table 7 for the key). Samples RS17 (5.5-6') and RS15 (15.5-16') show an aromatic hydrocarbon distribution pattern (Figures 54 and 55) relatively similar to that of a Bunker C oil (Figure 56), with the exception that the soil extracts display higher abundances of monoaromatic steranes (MAS) and triaromatic steranes (TAS) (probably due to chemical degradation). Figures 54 and 55 also show that the alkynaphthalenes and alkylphenanthrenes are the most dominant compounds in samples RS17 and RS15, with all other PAH compounds present in subordinate quantities, and alkylbenzenes and benzothiophenes absent in sample RS17. Among these PAH compounds identified are sulfur containing compounds, i.e. benzothiophene (BT); dibenzothiophenes (DBT) and naphthobenzothiophenes (NBT). The aromatic steranes are generally not detectable in the light and middle distillate products (e.g. gasoline, kerosene, jet fuels and #2 diesel) but are abundant in heavy, high temperature refined products. Also present in the samples from borings RS17 and RS15 (Figures 54 and 55) are benzo(a)pyrene, benzo(E)pyrene, and benzo(B+K)fluoranthene, which are generally absent in crude oils, but are present in refined products which have exposed to a high temperature heating process, i.e. Bunker C oil or petroleum residue. Thus, the presence of all these compounds lead to the conclusion that Bunker C oil is a

DRAFT

major contaminant source for samples from borings RS17 and RS15. The absence of alkylbenzenes and dibenzothiophenes in sample RS17 (5.5-6') (Figure 54) supports the conclusion that the product in sample (RS17) has suffered more degradation than that in sample RS15 (Figure 55).

In two samples collected from near the soil surface RS16 (0.5-1') and RS14 (1-1.5'), MAS and TAS are about the only remaining PAH's which have survived degradation (Figures 50 and 53).

The extract of sample RS16 (20-20.5') shows an aromatic hydrocarbon distribution pattern in which all PAH are present, with alkynaphthalenes appearing to be the most abundant hydrocarbons. This finding confirms that besides Bunker C oil, other fuel products, possibly Jet A or kerosene, are present in sample RS16 (20-20.5').

In summary, based on the distribution pattern of biomarkers (steranes and terpanes), isoprenoids and aromatic hydrocarbon compositions, we conclude that Bunker C oil is present in all five soil samples submitted. The proportion of PAH's which have survived in the samples analyzed, is a function of the sampling depth, i.e. samples from near the surface (i.e. RS16 0.5-1', and RS14 1-1.5') appear to have lost most of their hydrocarbons, except for MAS and TAS, whereas the deeper samples, e.g. RS15 (15.5-16'), RS16 (20-20.5') and RS17 (5.5-6') retain more hydrocarbons. In the sample from boring RS16 (20-20.5'), it appears that a small amount of another fuel product (possibly Jet A fuel) is also present. Furthermore, there is no evidence to confirm the presence of gasoline or diesel.

IV. CONCLUSIONS

Five (5) soil samples from four (4) borings drilled at the Walker property site located in Santa Fe Springs, California, were investigated for fuel type characterization. The analytical results of the study show that no volatile hydrocarbons were present in the samples submitted and soil extracted hydrocarbons represent a highly degraded Bunker C fuel, except for the sample collected from boring RS16 at 20-20.5', which appears to be contaminated with a mixture of Bunker C oil and a middle distillate product (possibly Jet A or kerosene).

The degree of hydrocarbon degradation at the site investigated is apparently a function of the depth. Hydrocarbons present at shallower depth (less than five feet) appear to be more degraded than those present

DRAFT

in the deeper intervals. The distribution patterns of the products characterized indicate that they have been in the environment for an extended period of time, probably longer than 20 years.

DRAFT

LIST OF TABLES

DRAFT

June 17, 1994

Table 1

Results of TPH (EPA 418.1) analysis performed on soil samples submitted by Harding Lawson Associates.

Sample ID	GGC ID	TPH Concentration $\mu\text{g/g}$
METHOD BLANK		ND
RS16 (0.5-1')	2462-1	360
RS16 (20.20.5')	2462-2	7900
RS14 (1-1.5')	2462-3	450
RS17 (5.5-6')	2462-4	5800
RS15 (15.5-16')	2462-5	9400

Matrix Spike and Matrix Spike Duplicate:

Sample ID	GGC ID	Spike Added	TPH Recovery (%)
RS16 (0.5-1')	2462-1 MS	500 ppm	102
RS16 (0.5-1')	2462-1 MSD	500 ppm	94

DRAFT

2462CON1

06-10-1994

Table 2

Results of gasoline range (C3-C10) hydrocarbon analysis performed on samples submitted by Harding Lawson Associates.
(relative %)

Sample	BLANK	RS16 0.5-1'	RS16 20-20.5	RS14 1-1.5	RS14 1-1.5	RS17 5.5-6'
GGC ID	2462	2462-1	2462-2	2462-3	2463-30	2462-4
1 propane	No Hydrocarbons	Detectable				
2 isobutane			No Hydrocarbons	Detectable		
3 isobutene + 1-butene				No Hydrocarbons	Detectable	
4 n-butane					No Hydrocarbons	Detectable
5 trans-2-butene						No Hydrocarbons
6 cis-2-butene						
7 3-methyl-1-butene						
8 isopentane						
9 1-pentene						
10 2-methyl-1-butene						
11 n-pentane						
12 2-methyl-1,3-butadiene (isoprene)						
13 trans-2-pentene						
15 2,2-dimethylbutane						
16 cyclopentene						
17 cyclopentane						
18 2,3-dimethylbutane + MTBE						
19 cis-4-methyl-2-pentene						
20 2-methylpentane						
21 3-methylpentane						
22 2-methyl-1-pentene						
23 1-hexene						
24 n-hexane						
25 methylcyclopentane						
26 2,4-dimethylpentane						
27 benzene						
28 cyclohexane						
29 2-methylhexane						
30 2,3-dimethylpentane						
31 1,1-dimethylcyclopentane						
32 cyclohexene						
33 3-methylhexane						
34 trans-1,3-dimethylcyclopentane						
35 cis-1,3-dimethylcyclopentane						
36 trans-1,2-dimethylcyclopentane						
37 2,2,4-trimethylpentane						
38 n-heptane						
39 2,2,3,4-tetramethylbutane						

* Blanks in the table indicates that the compound was not detected.

DRAFT

Table 2 (continued)

Results of gasoline range (C3-C10) hydrocarbon analysis performed on samples submitted by Harding Lawson Associates.
(relative %)

Sample GGC ID	BLANK	RS16 0.5-1'	RS16 20-20.5'	RS14 1-1.5'	RS14 1-1.5'	RS17 5.5-6'
	2462	2462-1	2462-2	2462-3	2462-3D	2462-4
41 methylcyclohexane						
45 2,5-dimethylhexane + 2,2,3-trimethylpentane						
46 2,4-dimethylhexane						
47 trans-1,2-cis-4-trimethylcyclopentane						
48 trans-1,2-cis-3-trimethylcyclopentane						
49 2,3,4-trimethylpentane						
50 toluene + 2,3,3-trimethylpentane						
51 2,3-dimethylhexane						
52 3-ethyl-2-methylpentane						
53 2-methylheptane						
54 4-methylheptane						
55 3-methylheptane						
56 n-octane						
57 ethylbenzene						
58 m-xylene + p-xylene						
59 4-methyloctane						
60 2-methyloctane						
61 3-ethylheptane						
62 o-xylene						
63 n-nonane						
64 n-propylbenzene						
65 1-methyl-3-ethylbenzene						
66 1-methyl-4-ethylbenzene						
67 1,3,5-trimethylbenzene			20.68			
68 3,3,4-trimethylheptane			3.53			
69 1-methyl-2-ethylbenzene			6.96			
70 1,2,4-trimethylbenzene			6.75			
71 n-decane						
72 1,2,3-trimethylbenzene			8.07			
73 indan			11.33			
74 1,3-diethylbenzene			8.12			
75 1,4-diethylbenzene						
76 n-butylbenzene			14.61			
77 1,4-dimethyl-2-ethylbenzene						
78 1,3-dimethyl-4-ethylbenzene			9.00			
79 1,2-dimethyl-4-ethylbenzene						

* Blanks in the table indicates that the compound was not detected.

DRAFT

Table 2 (continued)

Results of gasoline range (C3-C10) hydrocarbon analysis performed on samples submitted by Harding Lawson Associates.
(relative %)

Sample	RS15 15.5-16*
GGC ID	2462-5
1 propane	
2 isobutane	
3 isobutene + 1-butene	
4 n-butane	
5 trans-2-butene	
6 cis-2-butene	
7 3-methyl-1-butene	
8 isopentane	
9 1-pentene	
10 2-methyl-1-butene	
11 n-pentane	
12 2-methyl-1,3-butadiene (isoprene)	
13 trans-2-pentene	
15 2,2-dimethylbutane	
16 cyclopentene	
17 cyclopentane	
18 2,3-dimethylbutane + MTBE	
19 cis-4-methyl-2-pentene	
20 2-methylpentane	
21 3-methylpentane	
22 2-methyl-1-pentene	
23 1-hexene	
24 n-hexane	
25 methylcyclopentane	
26 2,4-dimethylpentane	
27 benzene	
28 cyclohexane	
29 2-methylhexane	
30 2,3-dimethylpentane	
31 1,1-dimethylcyclopentane	
32 cyclohexene	
33 3-methylhexane	
34 trans-1,3-dimethylcyclopentane	
35 cis-1,3-dimethylcyclopentane	
36 trans-1,2-dimethylcyclopentane	
37 2,2,4-trimethylpentane	
38 n-heptane	
39 2,2,3,4-tetramethylbutane	

No Hydrocarbons Detectable

* Blanks in the table indicates that the compound was not detected.

Table 2 (continued)

Results of gasoline range (C3-C10) hydrocarbon analysis performed on samples submitted by Harding Lawson Associates.
(relative %)

Sample GGC ID	RS15 15.5-16 [*] 2462-5
41 methylcyclohexane	
45 2,5-dimethylhexane + 2,2,3-trimethylpentane	
46 2,4-dimethylhexane	
47 trans-1,2-cis-4-trimethylcyclopentane	
48 trans-1,2-cis-3-trimethylcyclopentane	
49 2,3,4-trimethylpentane	
50 toluene + 2,3,3-trimethylpentane	
51 2,3-dimethylhexane	
52 3-ethyl-2-methylpentane	
53 2-methylheptane	
54 4-methylheptane	
55 3-methylheptane	
56 n-octane	
57 ethylbenzene	
58 m-xylene + p-xylene	
59 4-methyloctane	
60 2-methyloctane	
61 3-ethylheptane	
62 o-xylene	
63 n-nonane	
64 n-propylbenzene	
65 1-methyl-3-ethylbenzene	
66 1-methyl-4-ethylbenzene	
67 1,3,5-trimethylbenzene	
68 3,3,4-trimethylheptane	
69 1-methyl-2-ethylbenzene	
70 1,2,4-trimethylbenzene	
71 n-decane	
72 1,2,3-trimethylbenzene	
73 indan	
74 1,3-diethylbenzene	
75 1,4-diethylbenzene	
76 n-butylbenzene	
77 1,4-dimethyl-2-ethylbenzene	
78 1,3-dimethyl-4-ethylbenzene	
79 1,2-dimethyl-4-ethylbenzene	

No Hydrocarbons Detectable

* Blanks in the table indicates that the compound was not detected.

DRAFT

June 17, 1994

Table 3

Total extract contents of soil samples analyzed.

Sample ID	GGC ID	µg/g (weight %)
RS16 (0.5-1')	2462-1	2341 (0.23)
RS16 (20.20.5')	2462-2	6492 (0.65)
RS16 (20.20.5')	2462-2 (D)	7373 (0.74)
RS14 (1-1.5')	2462-3	4182 (0.42)
RS17 (5.5-6')	2462-4	20,978 (2.1)
RS15 (15.5-16')	2462-5	17,154 (1.7)

DRAFT

Table 4

Key for identification of the bicyclanes (m/z 123)

Peak No.	Identity	Formula	M.W.
a	2,2,3-Trimethylbicycloheptane	C ₁₀ H ₁₈	138
b	C ₁₀ bicyclic	C ₁₀ H ₁₈	138
c	3,3,7-Trimethylbicycloheptane	C ₁₀ H ₁₈	138
f	C ₁₄ bicyclic sesquiterpane	C ₁₄ H ₂₆	194
g	C ₁₅ bicyclic sesquiterpane	C ₁₅ H ₂₈	208
h	8β(H) drimane	C ₁₅ H ₂₈	208
i	C ₁₆ bicyclic sesquiterpane	C ₁₆ H ₃₀	222

DRAFT

Table 5 (continued)
Key for Tricyclic, Tetracyclic, and Pentacyclic Terpanes
Identification (m/z 191 Fragmentograms)

<u>Carbon Code</u>	<u>Identity</u>	<u>No.</u>
WS	22S-17 α ,21 β -30,31,32-Trishomohopane	33
WR	22R-17 α ,21 β -30,31,32-Trishomohopane	33
16a	C ₃₆ -Tricyclic Terpane #1	36
16b	C ₃₆ -Tricyclic Terpane #2	36
XS	22S-17 α ,21 β -30,31,32,33-Tetrahomohopane	34
XR	22R-17 α ,21 β -30,31,32,33-Tetrahomohopane	34
YS	22S-17 α ,21 β -30,31,32,33,34-Pentahomohopane	35
YR	22R-17 α ,21 β -30,31,32,33,34-Pentahomohopane	35

DRAFT

Table 5

**Key for Tricyclic, Tetracyclic, and Pentacyclic Terpanes
Identification (m/z 191 Fragmentograms)**

Carbon Code	Identity	No.
0	C ₂₀ -Tricyclic Terpane	20
1	C ₂₁ -Tricyclic Terpane	21
2	C ₂₂ -Tricyclic Terpane	22
3	C ₂₃ -Tricyclic Terpane	23
4	C ₂₄ -Tricyclic Terpane	24
5	C ₂₅ -Tricyclic Terpane	25
24	C ₂₄ -Tetracyclic Terpane	24
6	C ₂₆ -Tricyclic Terpane	26
7	C ₂₇ -Tricyclic Terpane	27
A	C ₂₈ -Tricyclic Terpane #1	28
B	C ₂₈ -Tricyclic Terpane #2	28
C	C ₂₉ -Tricyclic Terpane #1	29
D	C ₂₉ -Tricyclic Terpane #2	29
E	18 α -22,29,30-Trisnorhopane (Ts)	27
F	17 α -22,29,30-Trisnorhopane (Tm)	27
G	17 β -22,29-30-Trisnorhopane	27
H	17 α -23,28-Bisnorlupane	28
10a	C ₃₀ -Tricyclic Terpane #1	30
10b	C ₃₀ -Tricyclic Terpane #2	30
I	17 α -28,30-Bisnorhopane	28
11a	C ₃₁ -Tricyclic Terpane #1	31
J	17 α -25-Norhopane	29
11b	C ₃₁ -Tricyclic Terpane #2	31
K	17 α ,21 β -30-Norhopane	29
C ₂₉ Ts	18 α -30-Norneohopane	29
C ₃₀ *	17 α -Diahopane	30
L	17 β -21 α -30-Normoretane	29
Ma	18 α -Oleanane	30
Mb	18 β -Oleanane	30
N	17 α ,21 β -Hopane	30
O	17 β ,21 α -Moretane	30
13a	C ₃₃ -Tricyclic Terpane #1	33
13b	C ₃₃ -Tricyclic Terpane #2	33
P	22S-17 α ,21 β -30-Homohopane	31
Q	22R-17 α ,21 β -30-Homohopane	31
R	Gammacerane	30
14a	C ₃₄ -Tricyclic Terpane #1	34
S	17 β ,21 α -Homomoretane	31
14b	C ₃₄ -Tricyclic Terpane #2	34
T	22S-17 α ,21 β -30-Bishomohopane	32
U	22R-17 α ,21 β -30-Bishomohopane	32
15a	C ₃₅ -Tricyclic Terpane #1	35
15b	C ₃₅ -Tricyclic Terpane #2	35
V	17 β ,21 α -C ₃₂ -Bishomomoretane	32

Table 6
Key for Steranes Identification (m/z 217 fragmentogram)

<u>Carbon Code</u>	<u>Identity</u>	<u>No.</u>
1	13 β ,17 α -diacholestane (20S)	27
2	13 β ,17 α -diacholestane (20R)	27
3	13 α ,17 β -diacholestane (20S)	27
4	13 α ,17 β -diacholestane (20R)	27
5	24-methyl-13 β ,17 α -diacholestane (20S)	28
6	24-methyl-13 β ,17 α -diacholestane (20R)	28
7D	24-methyl-13 α ,17 β -diacholestane (20S)	28
7	14 α ,17 α -cholestane (20S)	27
8 + 8D	14 β ,17 β -cholestane (20R) + 24-ethyl-13 β ,17 α -diacholestane (20S)	27 + 29
9	14 β ,17 β -cholestane (20S)	27
9D	24-methyl-13 α ,17 β -diacholestane (20R)	28
10	14 α ,17 α -cholestane (20R)	27
11	24-ethyl-13 β ,17 α -diacholestane (20R)	29
12	24-ethyl-13 α ,17 β -diacholestane (20S)	29
13	24-methyl-14 α ,17 α -cholestane (20S)	28
14 + 14D	24-methyl-14 β ,17 β -cholestane (20R) + 24-ethyl-13 α ,17 β -diacholestane (20R)	28 + 29
15	24-methyl-14 β ,17 β -cholestane (20S)	28
16	24-methyl-14 α ,17 α -cholestane (20R)	28
17	24-ethyl-14 α -cholestane (20S)	29
18	24-ethyl-14 β ,17 β -cholestane (20R)	29
19	24-ethyl-14 β ,17 β -cholestane (20S)	29
20	24-ethyl-14 α ,17 α -cholestane (20R)	29
21A	24-n-Propylcholestanes	30
21B	4-Methyl-24-ethylcholestane	30

DRAFT

Table 7
Key for Identifying Aromatic Hydrocarbons (cont'd)

No.	m/z	Compound
33	148	C ₁ -benzothiophenes
34	162	C ₂ -benzothiophenes
35	176	C ₃ -benzothiophenes
36	190	C ₄ -benzothiophenes
37	204	C ₅ -benzothiophenes
28	184	C ₀ -dibenzothiophene
39	198	C ₁ -dibenzothiophenes
40	212	C ₂ -dibenzothiophenes
41	226	C ₃ -dibenzothiophenes
42	240	C ₄ -dibenzothiophenes
43	234	C ₀ -naphthobenzothiophene
44	248	C ₁ -naphthobenzothiophenes
45	262	C ₂ -naphthobenzothiophenes
46	276	C ₃ -naphthobenzothiophenes
47	290	C ₄ -naphthobenzothiophenes
48	253	Monoaromatic steranes
49	267	Monoaromatic steranes
50	239	Monoaromatic steranes
51	231	Triaromatic steranes
52	245	Triaromatic steranes

PRODUCT

Table 7

Key for Identifying Aromatic Hydrocarbons

No.	m/z	Compound
1	120	C ₃ -alkylbenzenes
2	134	C ₄ -alkylbenzenes
3	148	C ₅ -alkylbenzenes
4	162	C ₆ -alkylbenzenes
5	128	C ₀ -naphthalene
6	142	C ₁ -naphthalenes
7	156	C ₂ -naphthalenes
8	170	C ₃ -naphthalenes
9	184	C ₄ -naphthalenes
10	166	C ₀ -fluorene
11	180	C ₁ -fluorenes
12	194	C ₂ -fluorenes
13	208	C ₃ -fluorenes
14	222	C ₄ -fluorenes
15	154	C ₀ -biphenyl
16	168	C ₁ -biphenyls + dibenzofuran
17	182	C ₂ -biphenyls + C ₁ -dibenzofuran
18	178	C ₀ -phenanthrene
19	192	C ₁ -phenanthrenes
20	206	C ₂ -phenanthrenes
21	220	C ₃ -phenanthrenes
22	234	C ₄ -phenanthrenes
23	202	C ₀ -pyrene/fluoranthene
24	216	C ₁ -pyrenes/fluoranthenes
25	230	C ₂ -pyrenes/fluoranthenes
26	244	C ₃ -pyrenes/fluoranthenes
27	258	C ₄ -pyrenes/fluoranthenes
28	228	C ₀ -chrysene
29	242	C ₁ -chrysenes
30	256	C ₂ -chrysenes
31	270	C ₃ -chrysenes
32	284	C ₄ -chrysenes

DRAFT

LIST OF FIGURES

RS14 1-1.5

Global Geochemistry Corporation

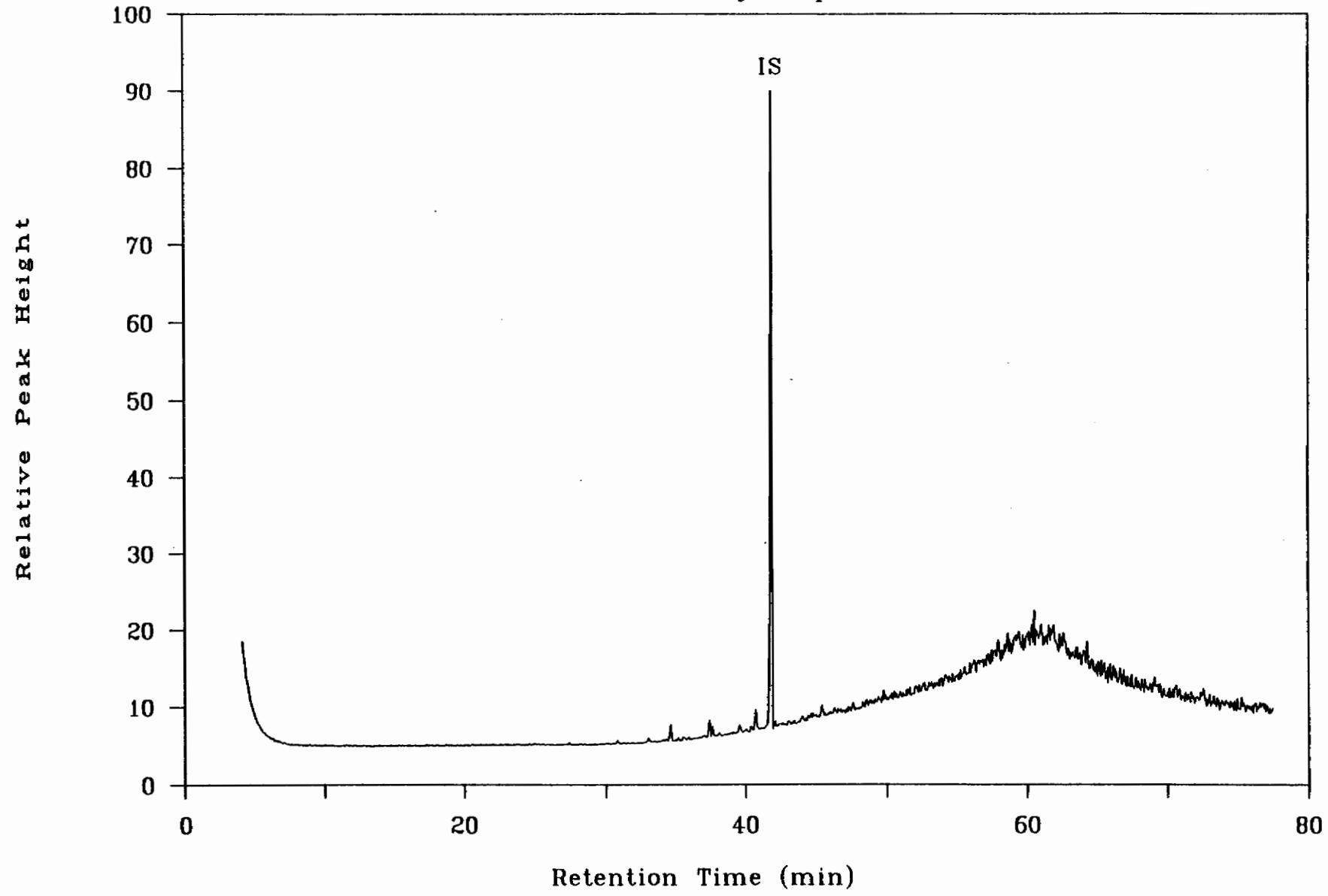


Figure 10: C₈₊ gas chromatogram of extract of soil sample RS14 (1-1.5').

RS15 15.5-16

Global Geochemistry Corporation

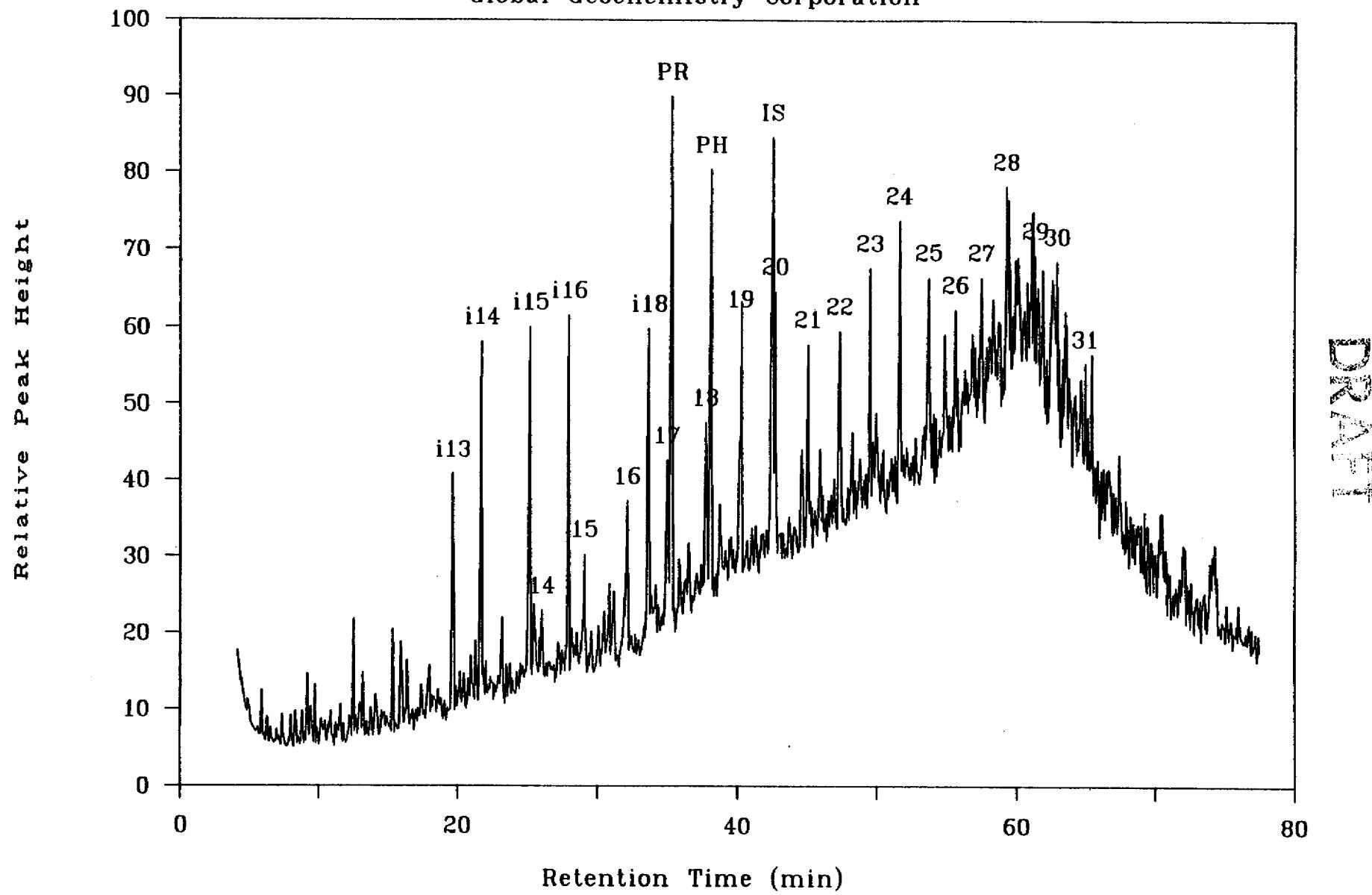


Figure 15: C₈₊ gas chromatogram of extract of sample RS15 (15.5-16').

RS16 20-20.5

Global Geochemistry Corporation

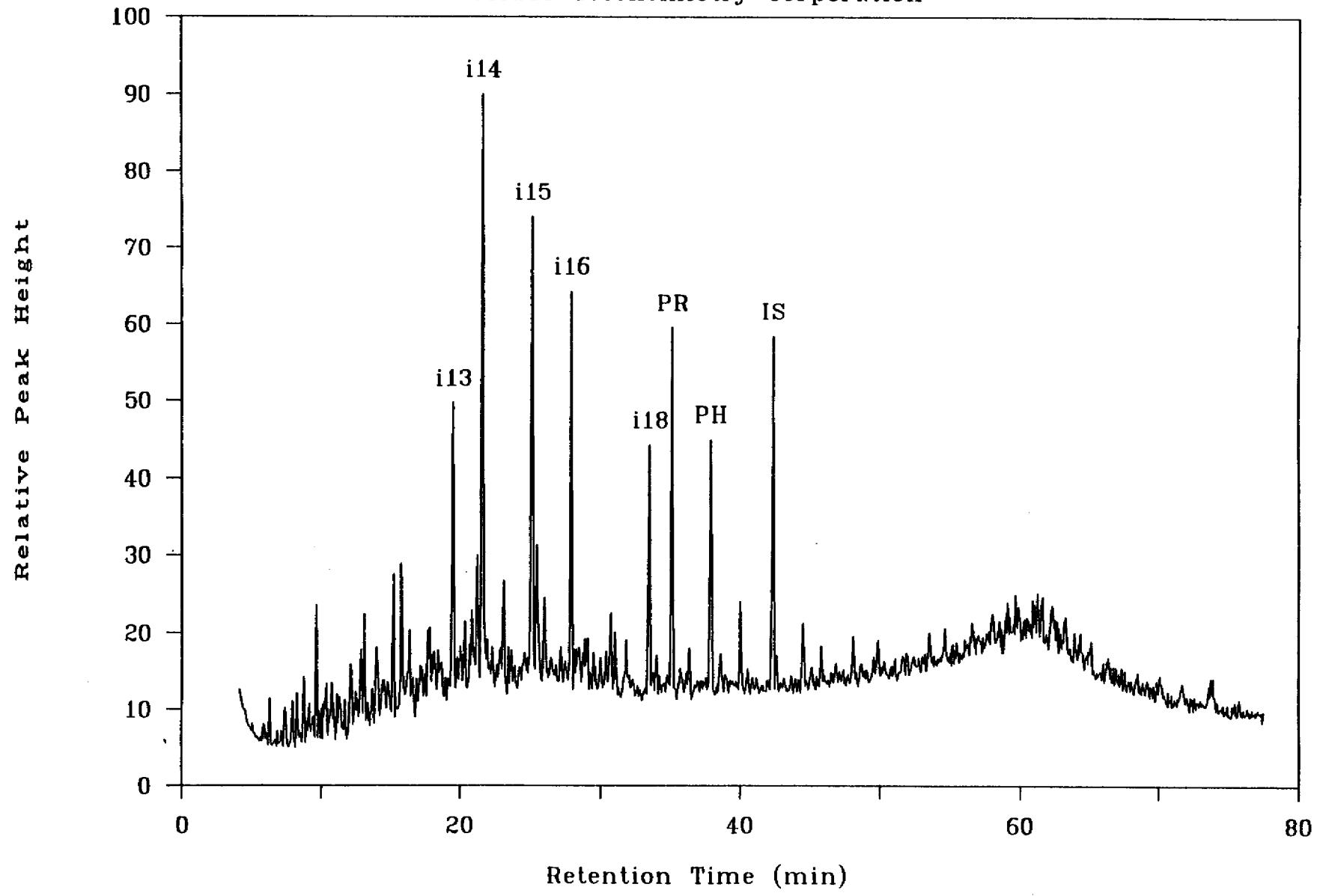


Figure 12: C₈+ gas chromatogram of extract of soil sample RS16 (20-20.5').

RS16 0.5-1

Global Geochemistry Corporation

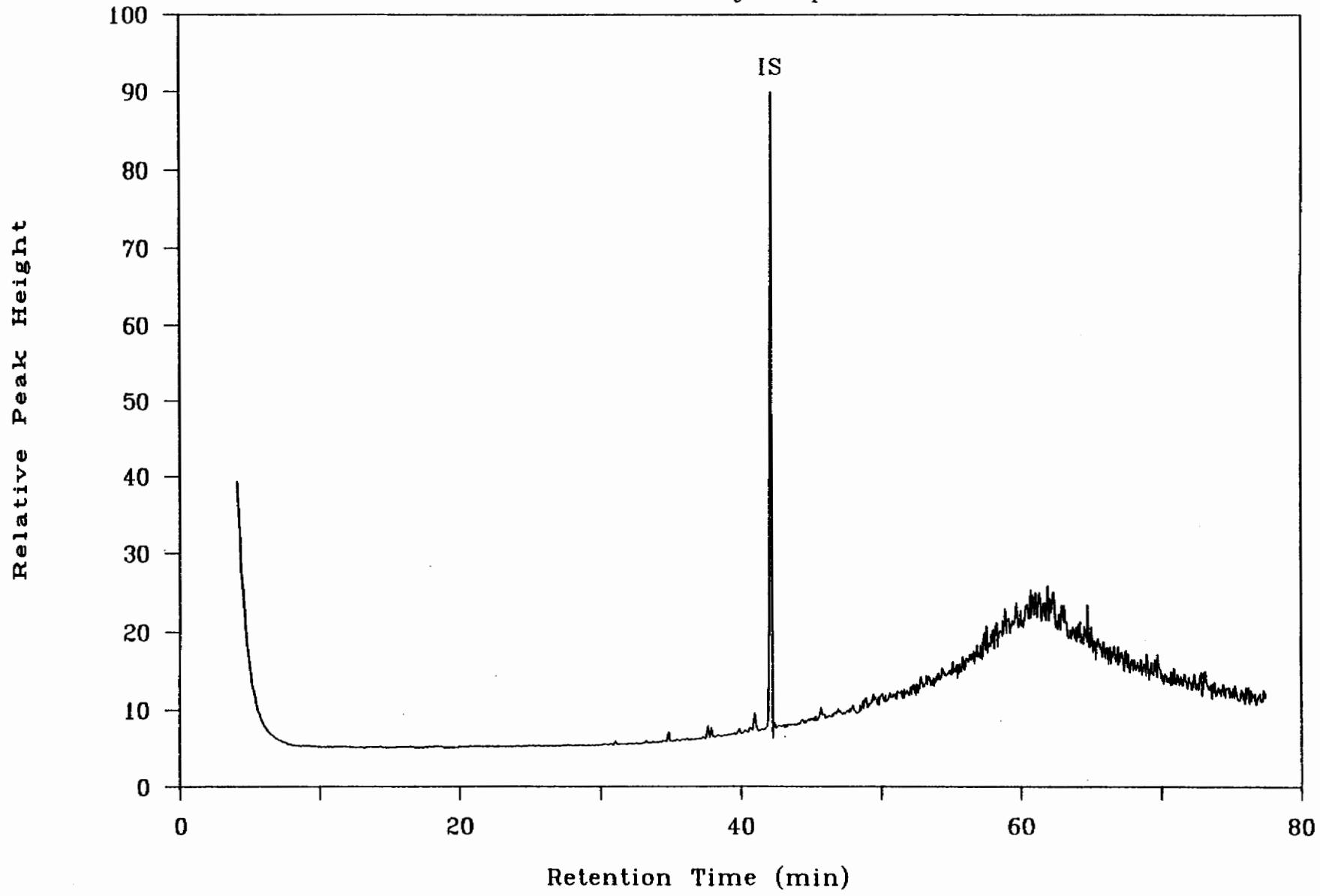


Figure 11: C₈₊ gas chromatogram of extract of soil sample RS16 (0.5-1').

RS16 20-20.5 (Duplicate)

Global Geochemistry Corporation

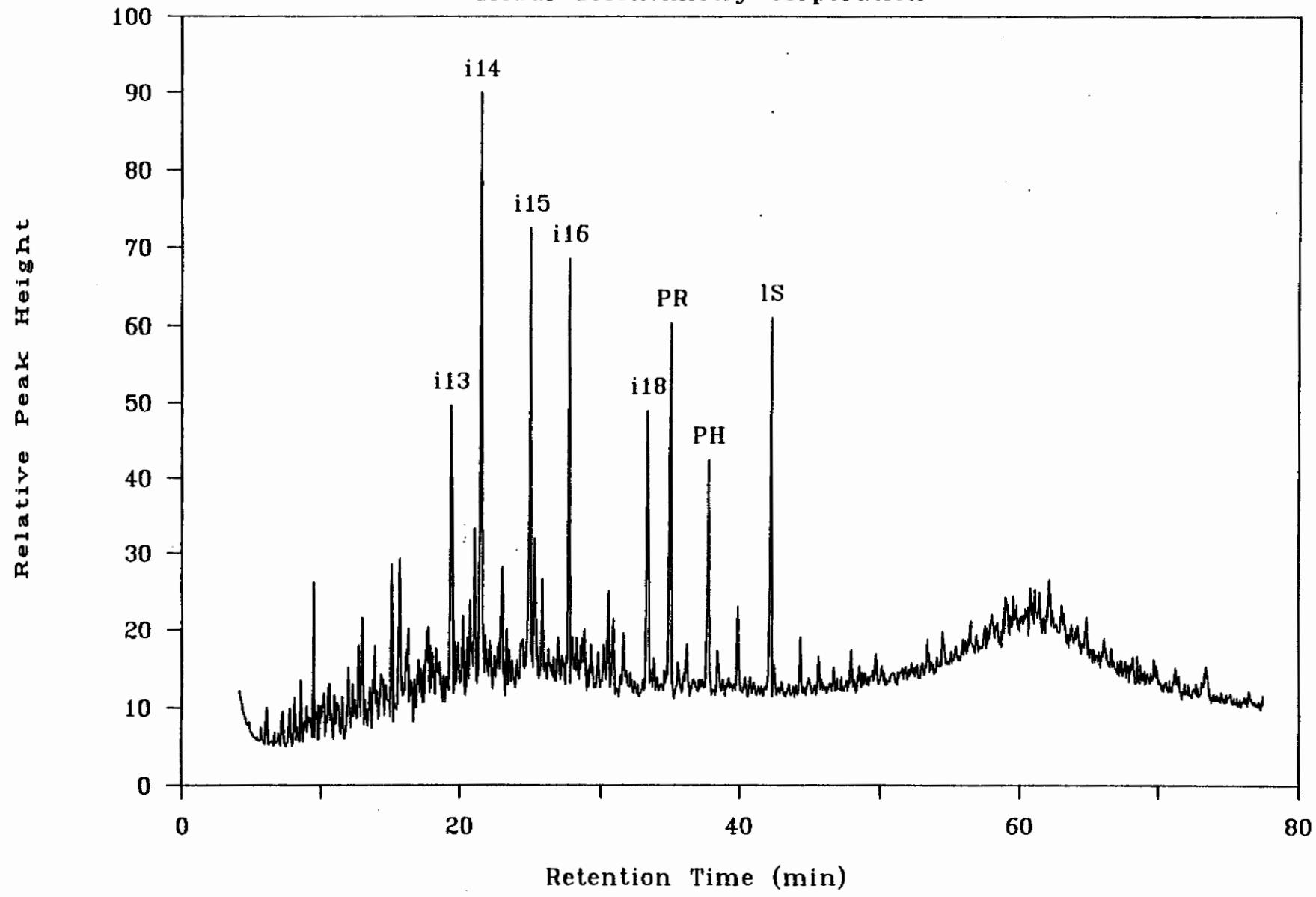


Figure 13: C₈₊ gas chromatogram of extract of sample RS16 (20-20.5') (duplicate).

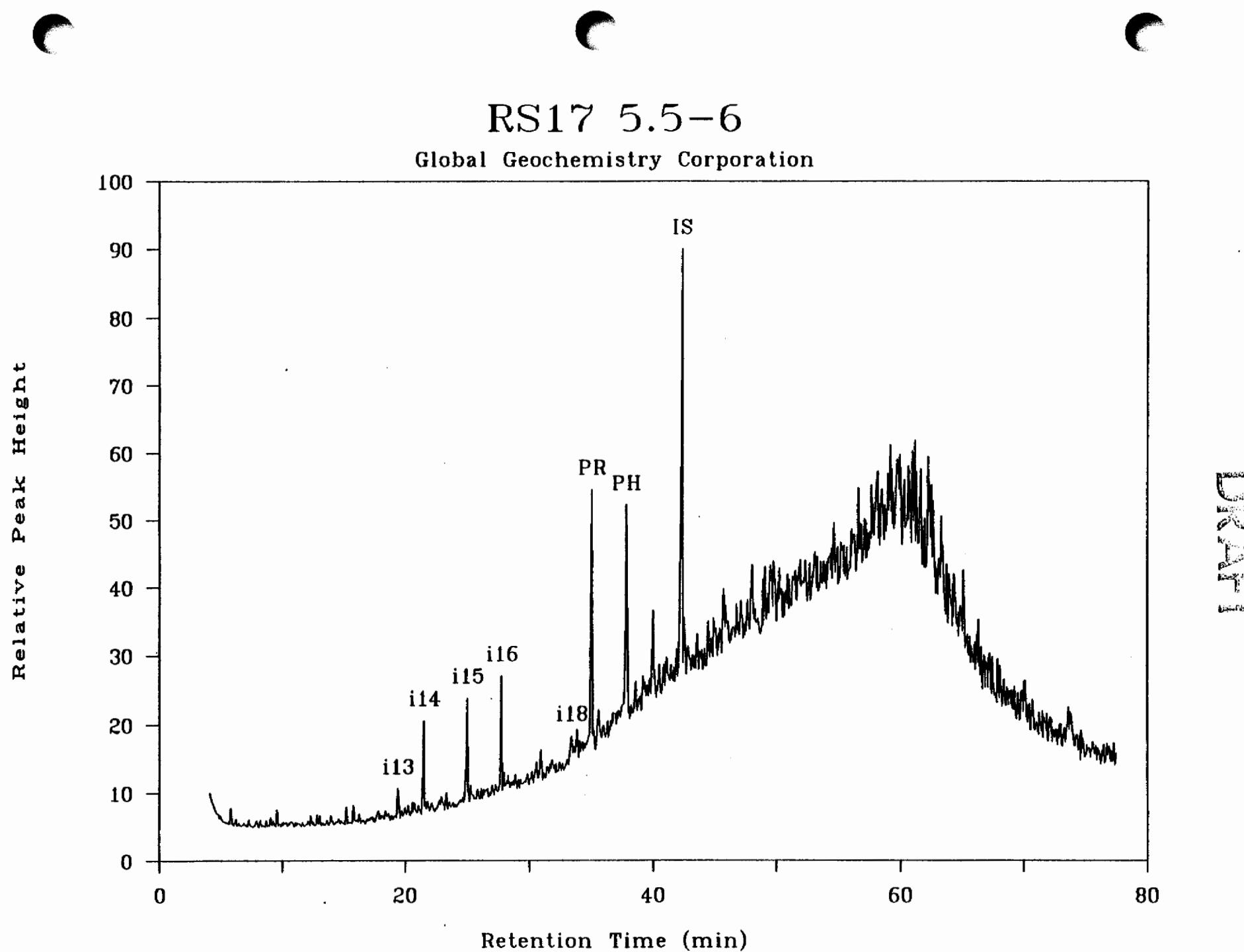


Figure 14: C₈+ gas chromatogram of extract of sample RS17 (5.5-6').



Std (C8-32)
Global Geochemistry Corporation

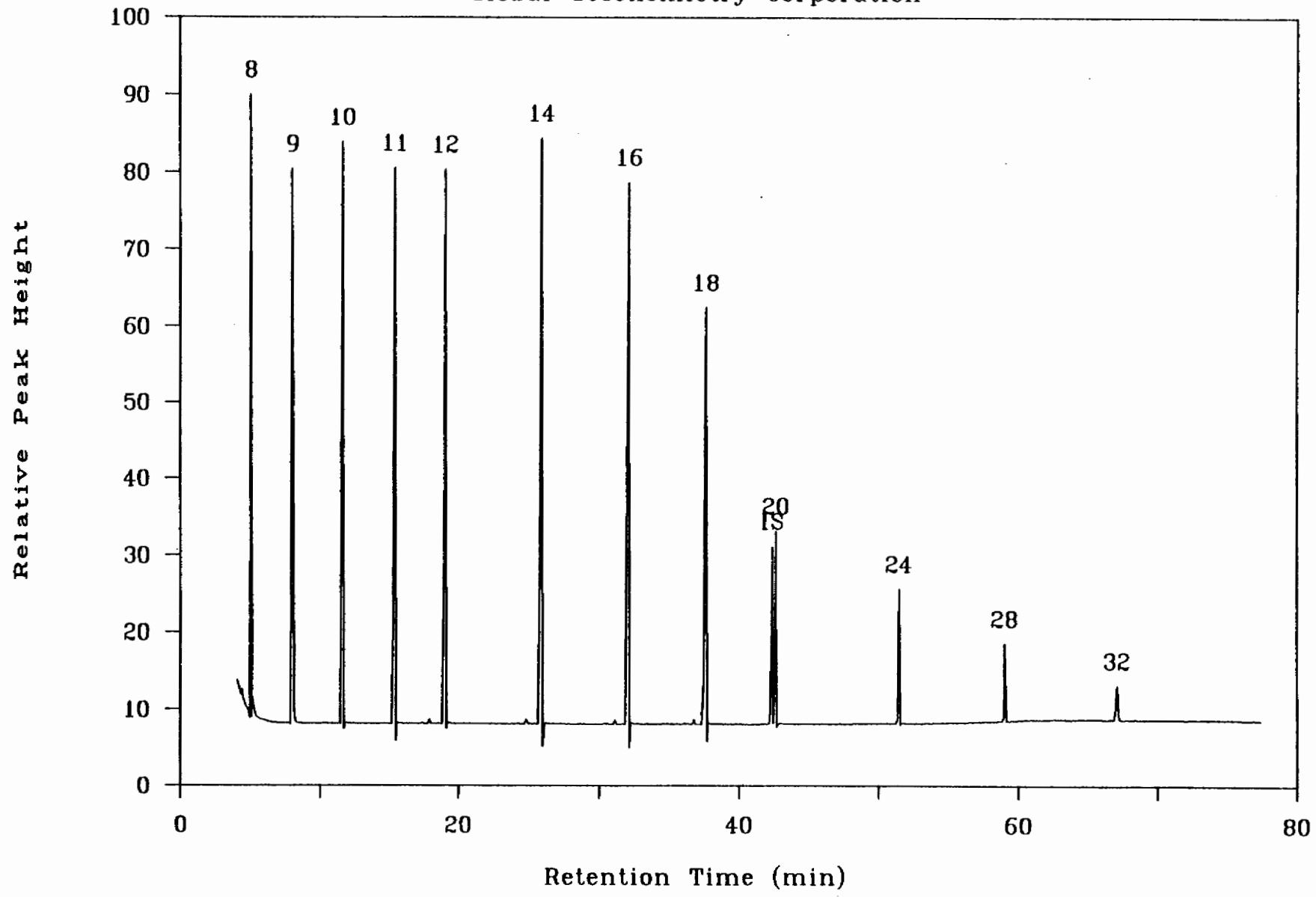
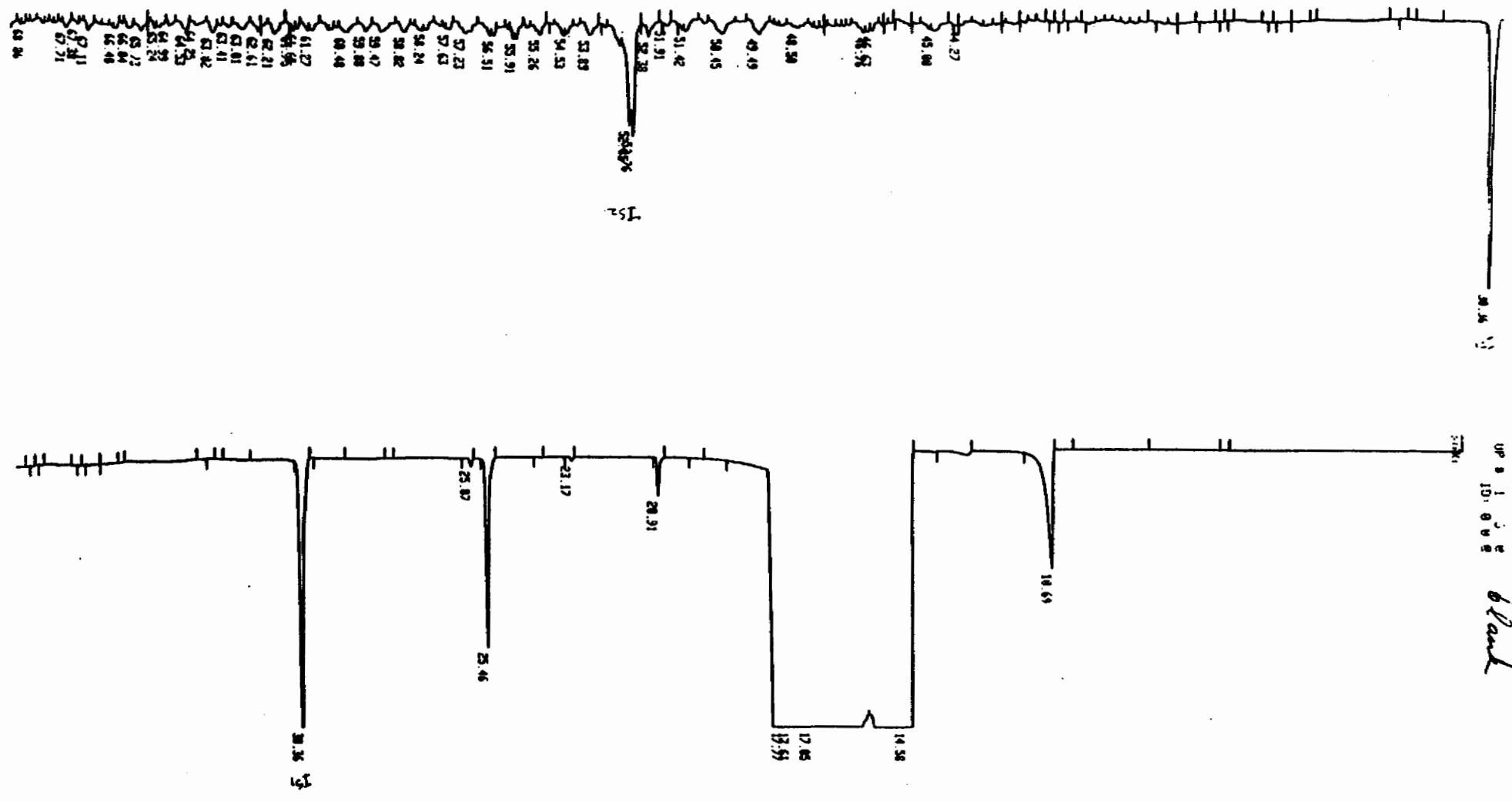


Figure 9: C₈₊ gas chromatogram of a C₈-C₃₂ normal alkane standard mixture.

DIAVAC

DRAFT

Figure 1: C₃-C₁₀ gas chromatogram of a procedural blank (CS₂ extract).



DRAFT

Figure 2: C₃-C₁₀ gas chromatogram of sample RS16 (0.5-1').

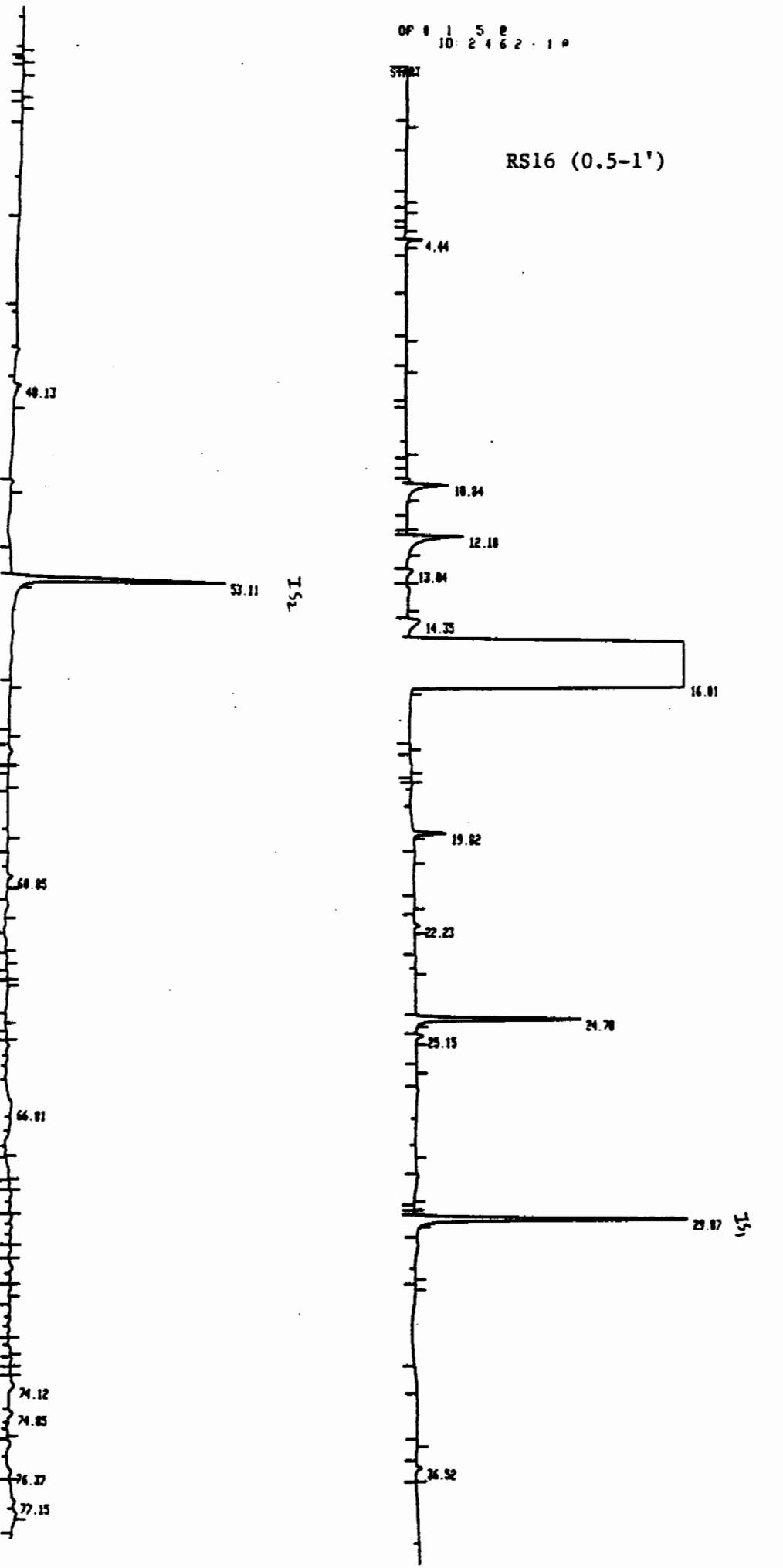
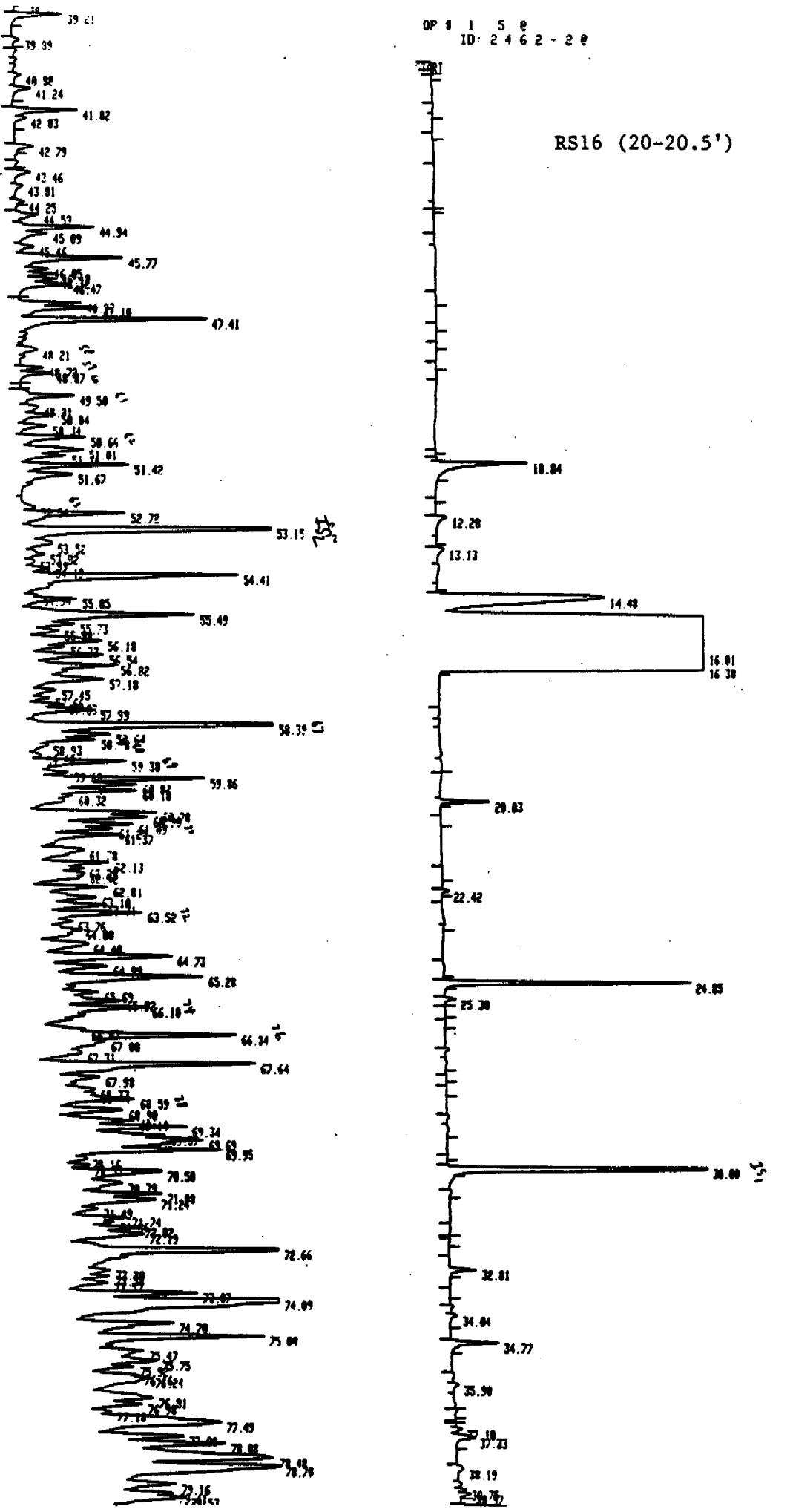
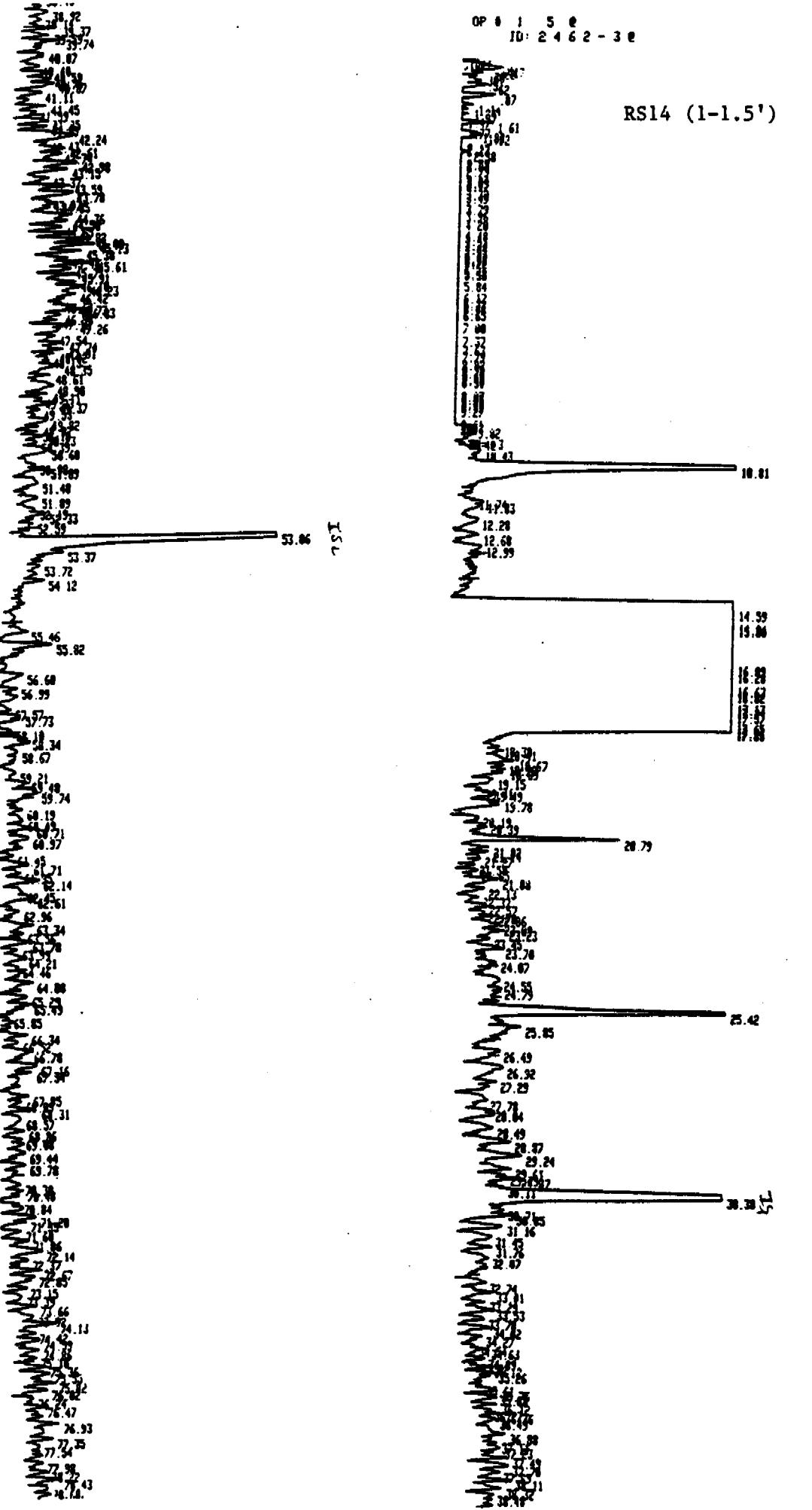


Figure 3: C₃-C₁₀ gas chromatogram of sample RS16 (20-20.5').



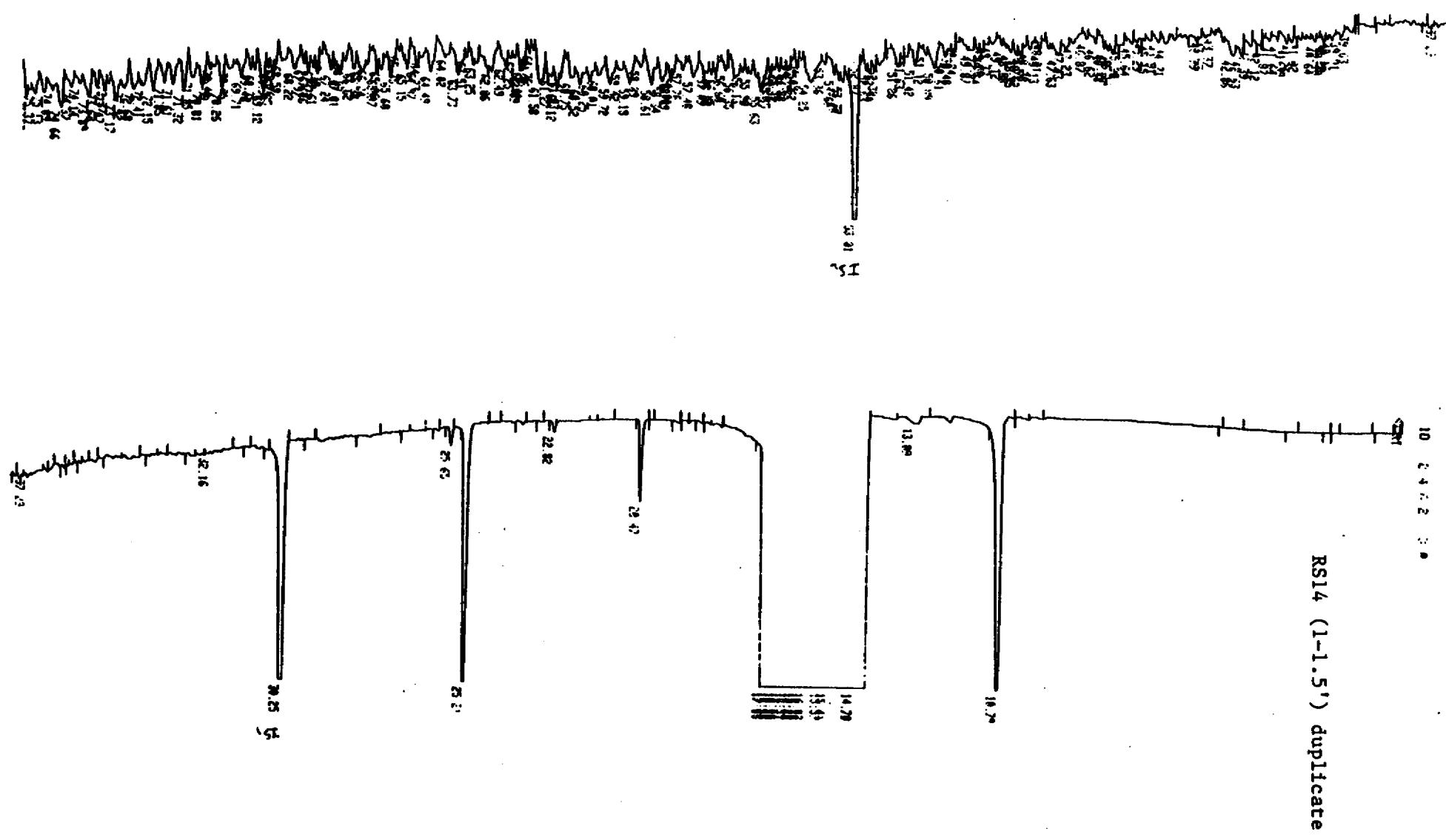
LJKARL

Figure 4: C₃-C₁₀ gas chromatogram of sample RS14 (1-1.5').



DRAFT

Figure 5: C₃-C₁₀ gas chromatogram of sample RS14 (1-1.5') (duplicate).



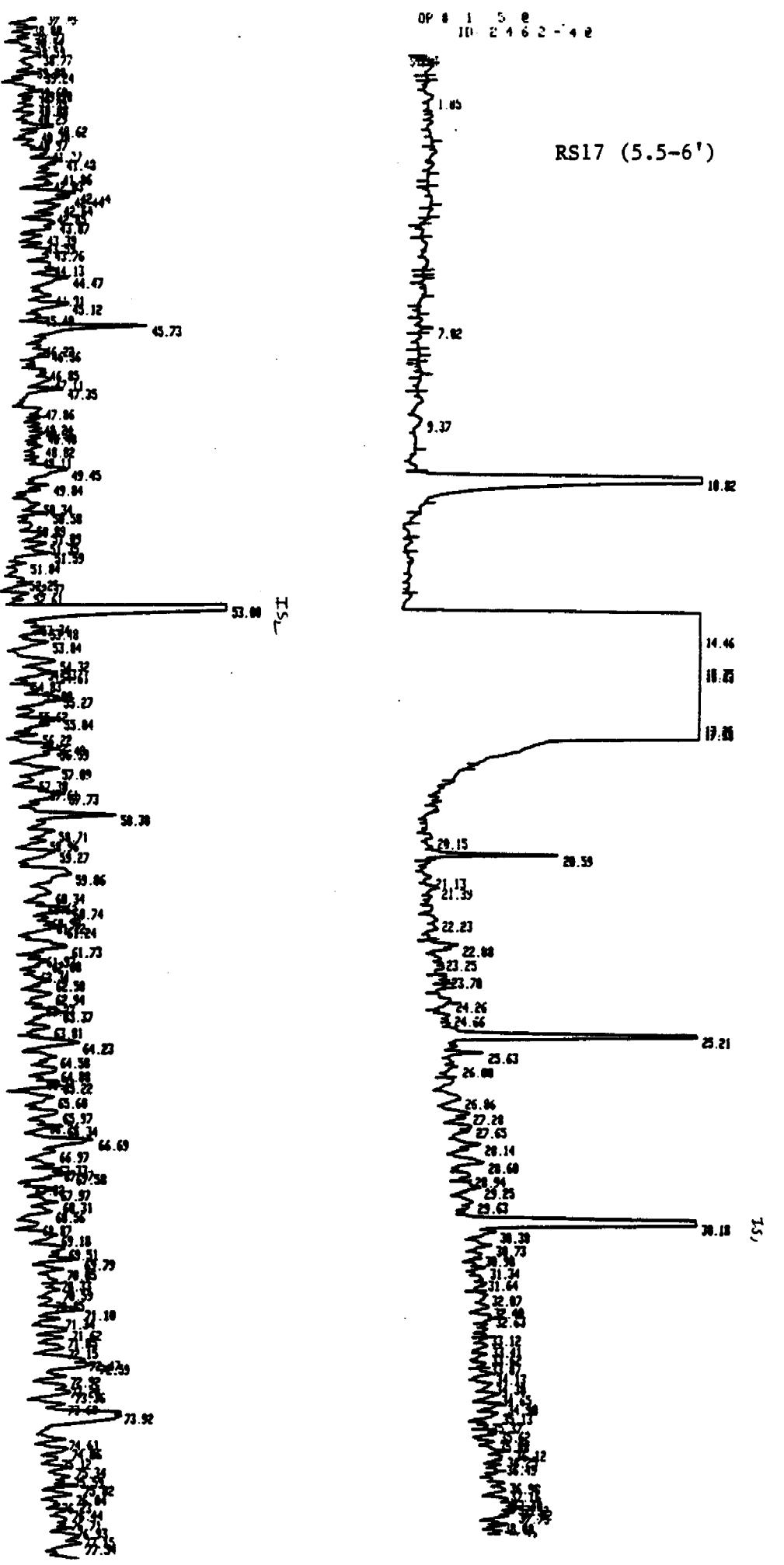
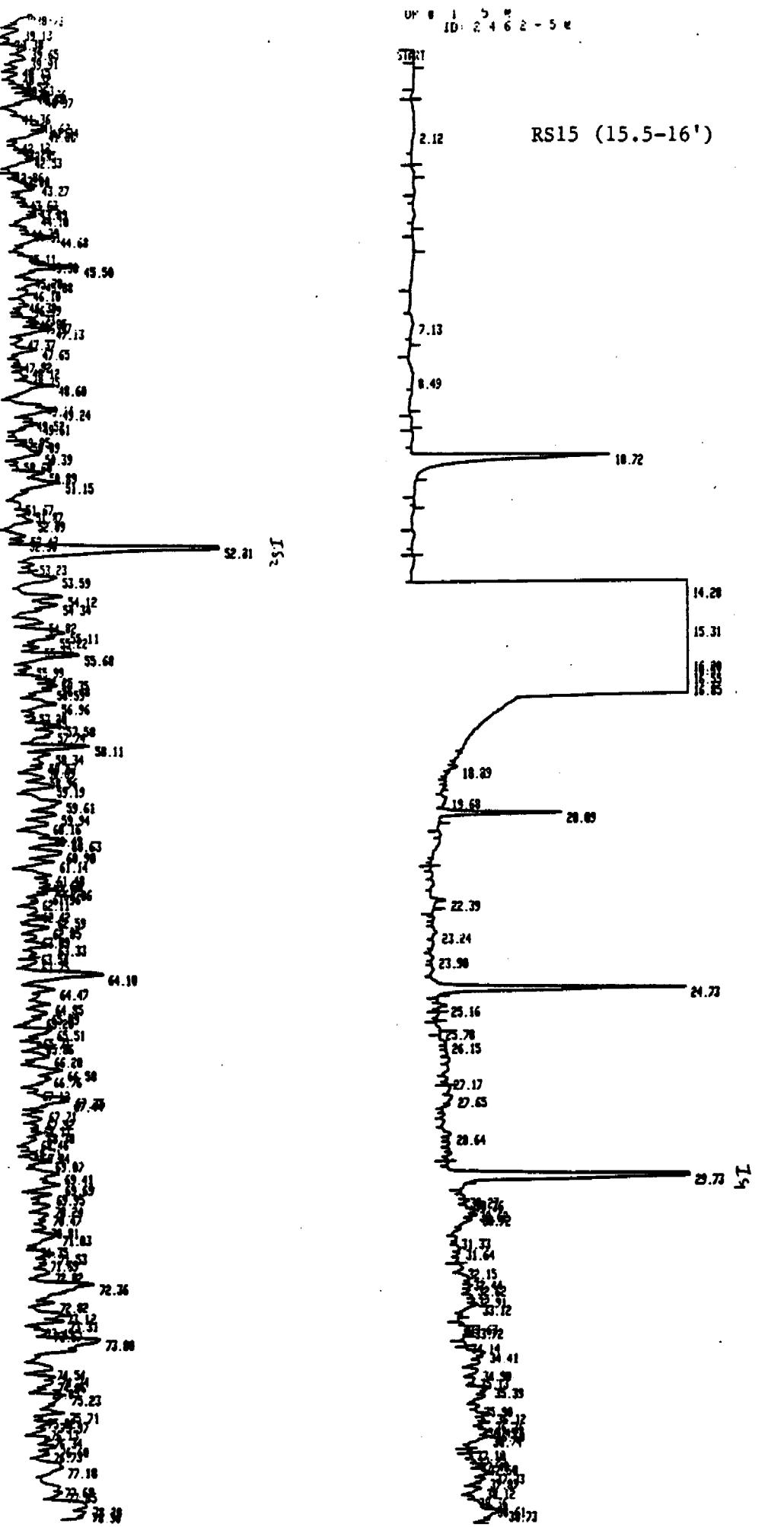


Figure 6: C₃-C₁₀ gas chromatogram of sample RS17 (5.5-6').

DRAFT

Figure 7: C₃-C₁₀ gas chromatogram of sample RS15 (15.5-16').



DRAFT

BLANK

Global Geochemistry Corporation

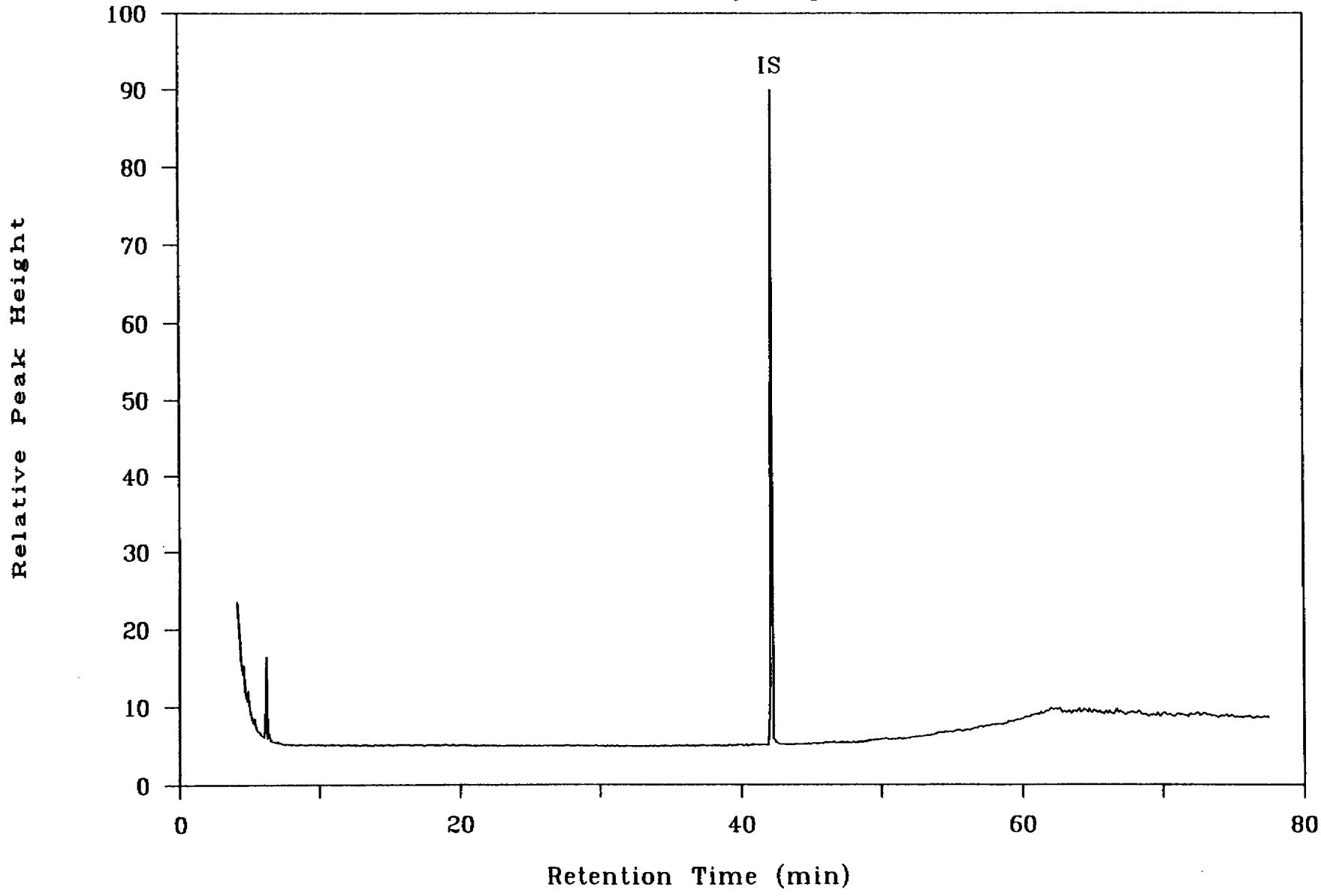


Figure 8: C₈₊ gas chromatogram procedural blank (methylene chloride solvent).

Figure 16: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS15 (15.5-16').

MASS CHROMATOGRAM

06/07/94 12:09:00

DATA: G5465 #1

SCANS 300 TO 2700

CALI: G5465 #1

SAMPLE: HLA RS15 15.5-16' (A2462-5) 0.5UL OF 4310UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DRAFT

69504.

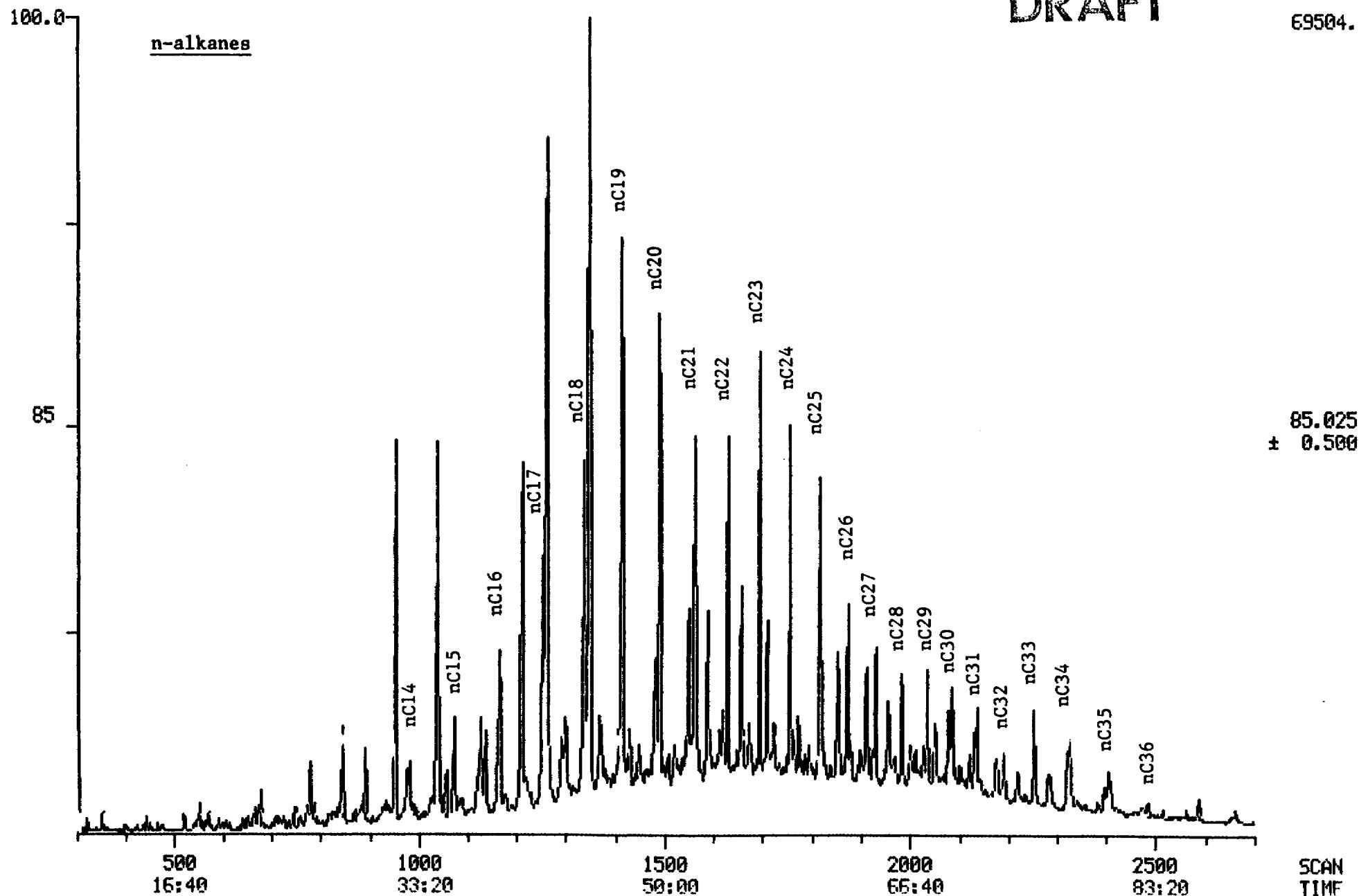


Figure 17: Mass chromatogram of n-alkanes (m/z 85) obtained from Bunker oil.

MASS CHROMATOGRAM

06/06/94 16:36:00

SAMPLE: VENEZUELAN BUNKER C FUEL OIL ASPHALTEN FREE

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2600 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: G5468 #1

CALI: G5468 #1

SCANS 300 TO 2700

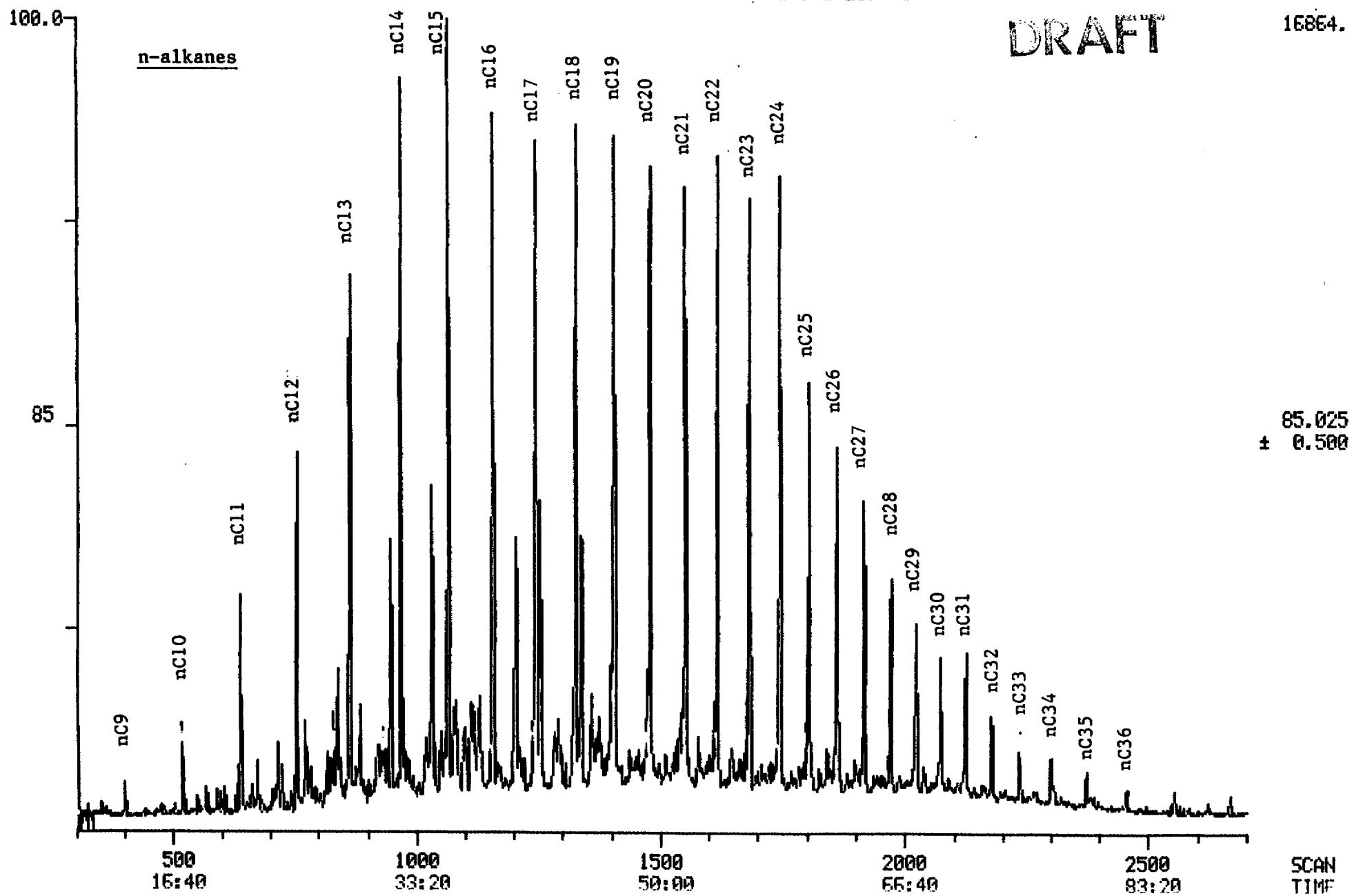


Figure 18: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS14 (1-1.5').

MASS CHROMATOGRAM
06/06/94 15:26:00

DATA: G5463 #1
CHLI: G5463 #1

SCANS 300 TO 2700

SAMPLE: HLA RS14 1-1.5' (A2462-3) 1.2UL OF 4210UL +0.5UL STD
COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DRAFT

4880.

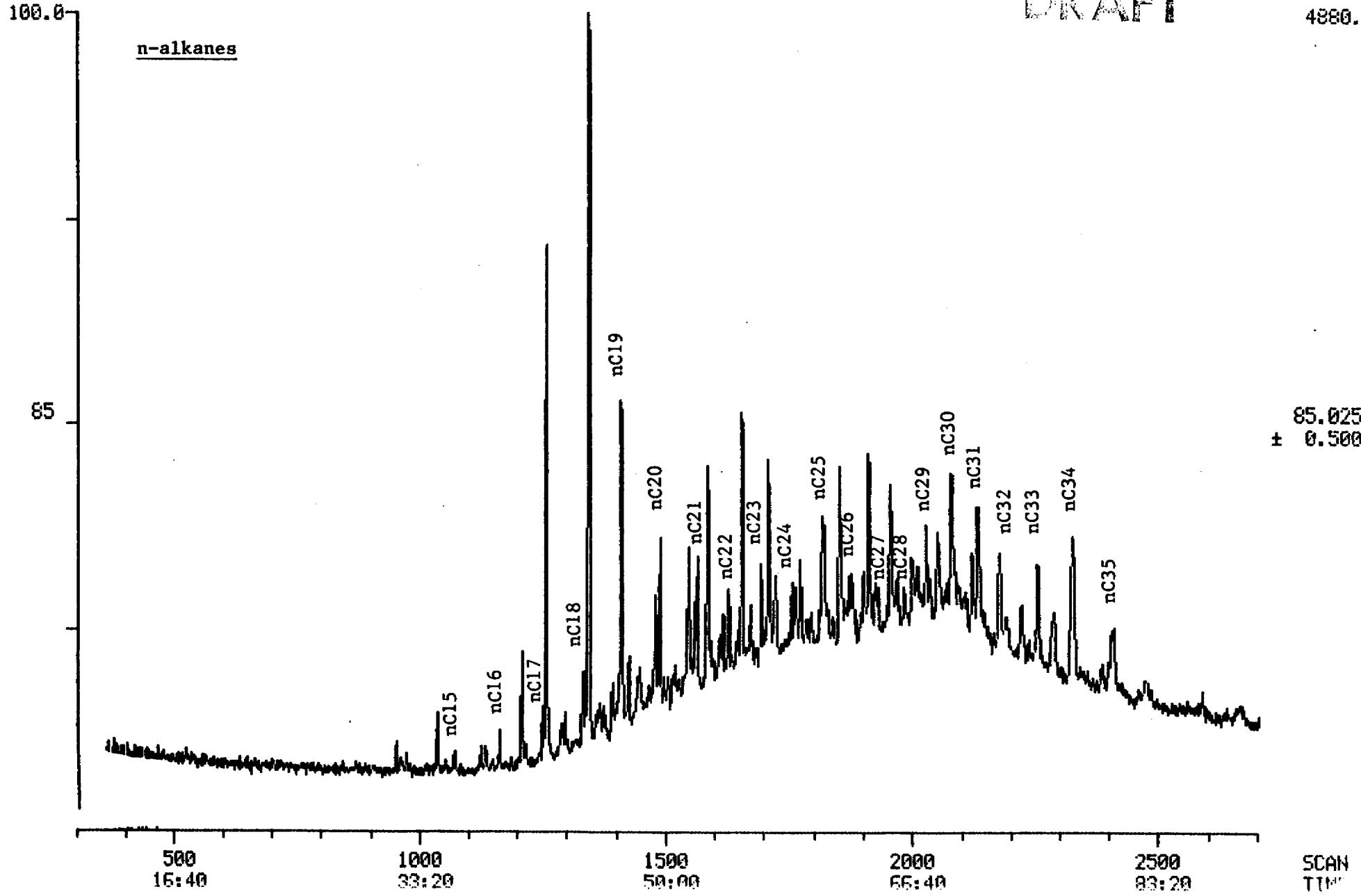


Figure 19: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS16 (0.5-1').

MASS CHROMATOGRAM

06/06/94 13:35:00

DATA: G5461 #1

SCANS 300 TO 2700

CHRL: G5461 #1

SAMPLE: HLA RS16 0.5-1' (A2462-1) 1.0UL OF 2500UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DRAFT

3708.

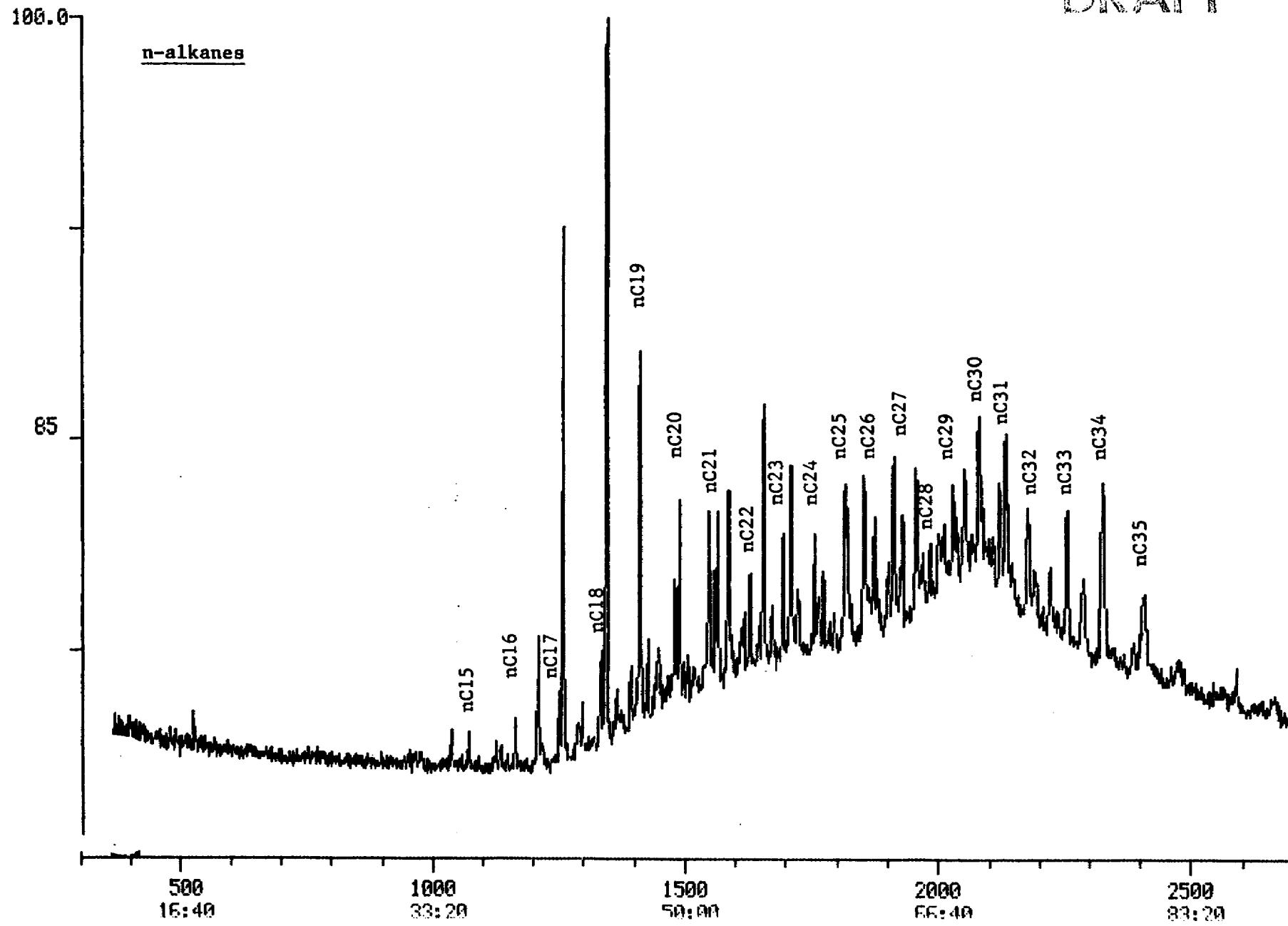


Figure 20: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS16 (20-20.5').

MASS CHROMATOGRAM

06/06/94 11:49:00

DATA: G5462 #1

SCANS 300 TO 2700

CALIB: G5462 #1

SAMPLE: HLA RS16 20-20.5' (A2462-2) 1.2UL OF 6000UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DRAFT

101632.

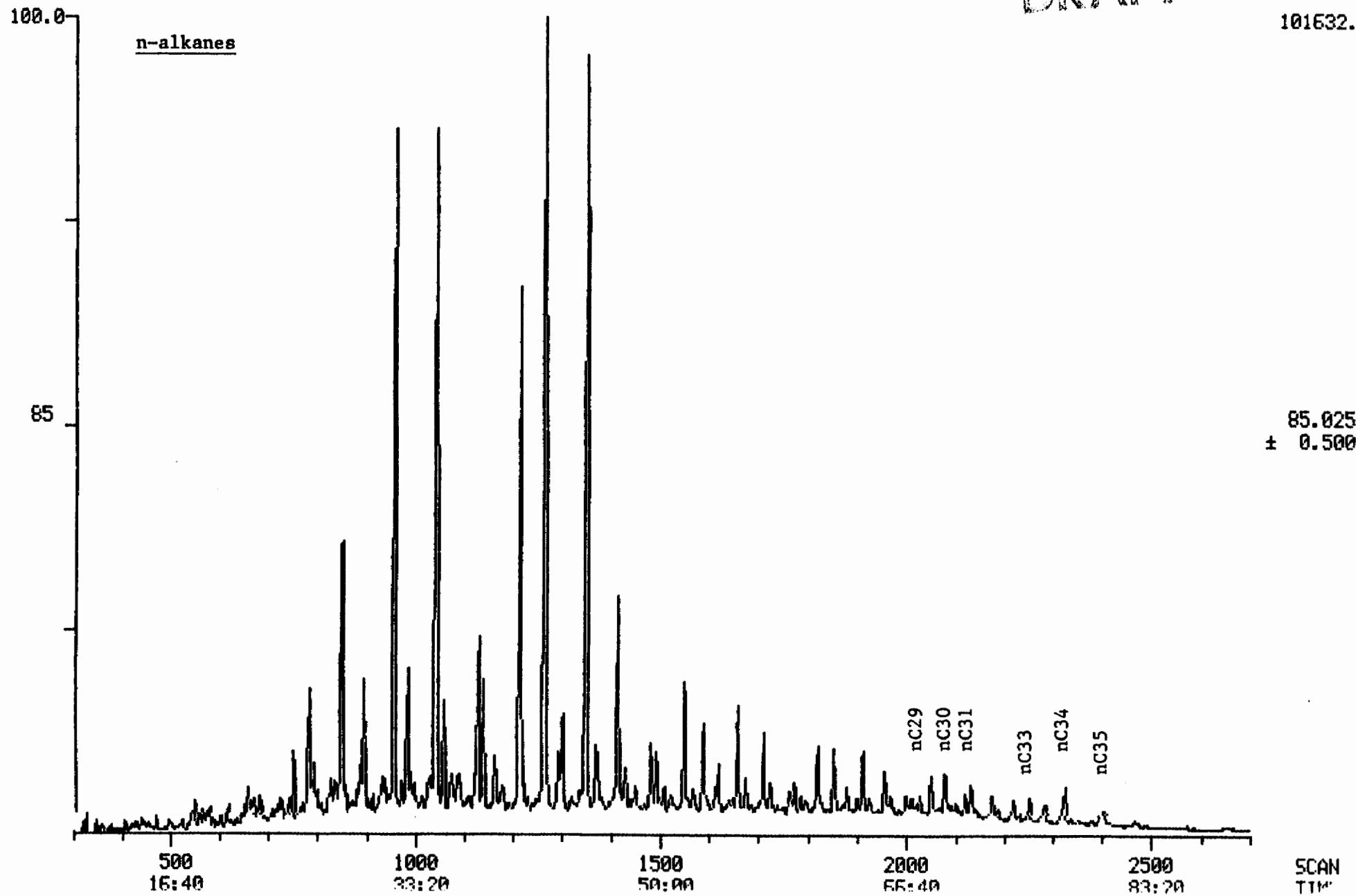


Figure 21: Mass chromatogram of n-alkanes (m/z 85) obtained from sample RS17 (5.5-6').

MASS CHROMATOGRAM

06/07/94 13:57:00

DATA: G5464 #1

SCANS 300 TO 2700

CHLI: G5464 #1

SAMPLE: HLA RS17 5.5-6' (A2462-4) 0.4UL OF 4930UL +0.5UL STD

COND.: 4 MIN @ 50C 40/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2600 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

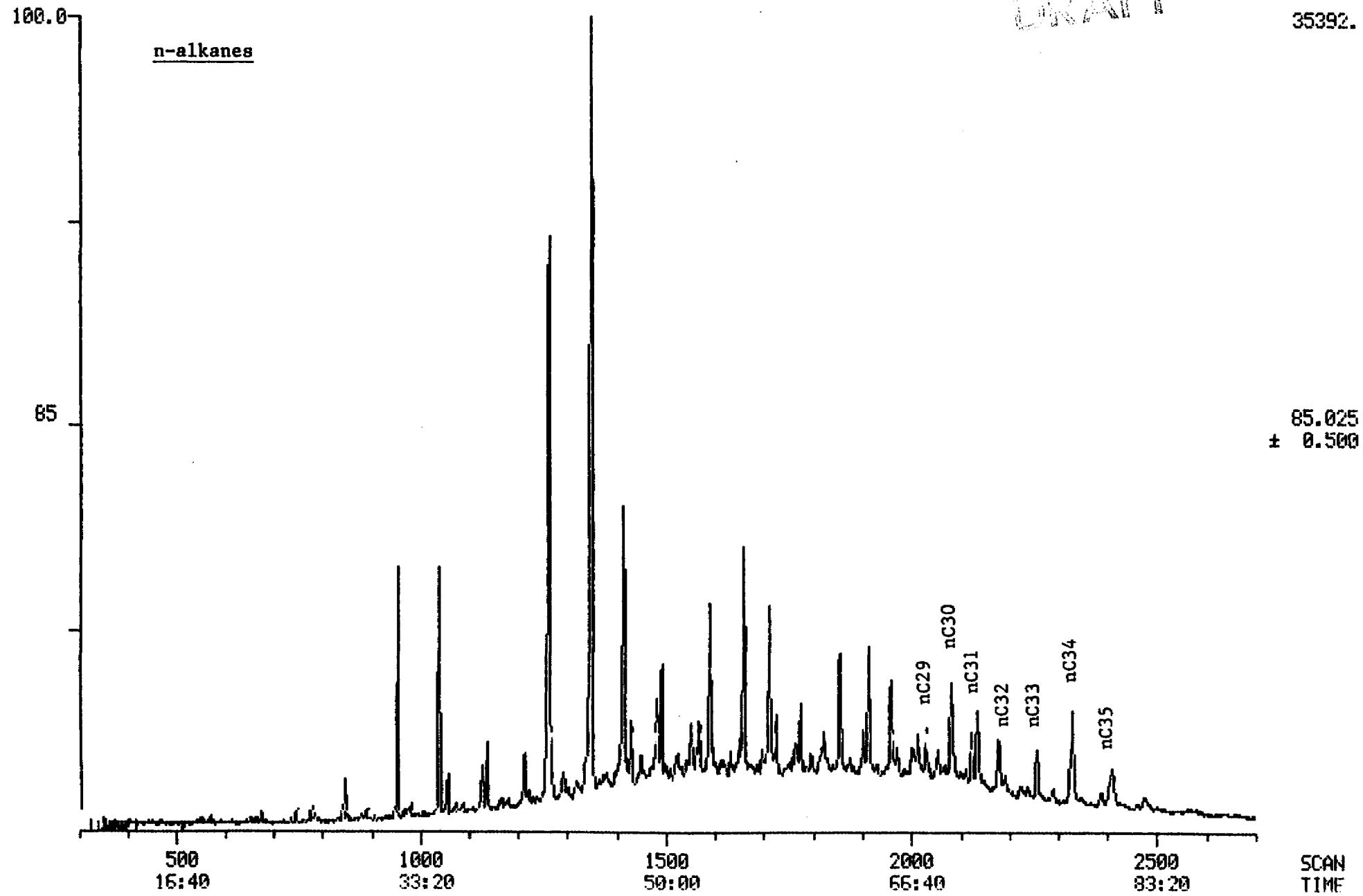


Figure 22: Mass chromatogram of alkylcyclohexanes (m/z 83) obtained from sample RS15 (15.5-16').

MASS CHROMATOGRAM

06/07/94 12:09:00

DATA: G5465 #1

SCANS 100 TO 1500

CALI: G5465 #1

SAMPLE: HLA RS15 15.5-16' (A2462-5) 0.5UL OF 4310UL +0.5UL STD

COND.: 4 MIN @ 50C 40/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2600 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

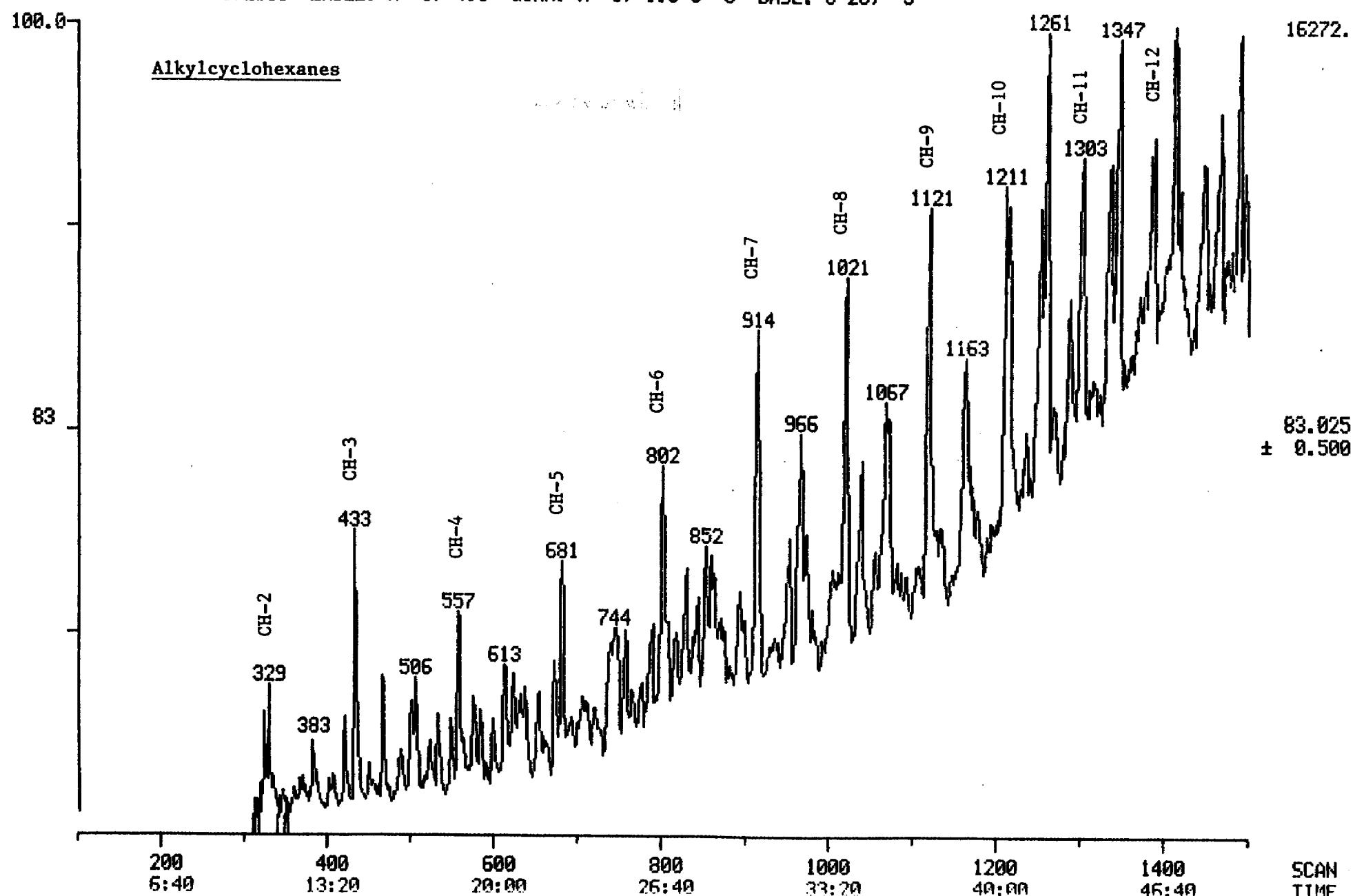


Figure 23: Mass chromatogram of alkylcyclohexanes (m/z 83) obtained from sample RS17 (5.5-6').

MASS CHROMATOGRAM

06/07/94 13:57:00

SUMMARY REPORTS

SHAPLE: HHA R517 3.5-6 (K2462-47) 8.40L OF 43360L 16.30L STD CONDS: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DR-1 60M COLUMN

CONDENSER: 4 MIN E 300°C 40°/MIN TO 310°C (30 MIN) DB-1 60M COLUMN

RANGE: 0 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 30

DATA: G5464 #1

CHLI: GS464 #1

SCANS 100 TO 1500

DRAFT

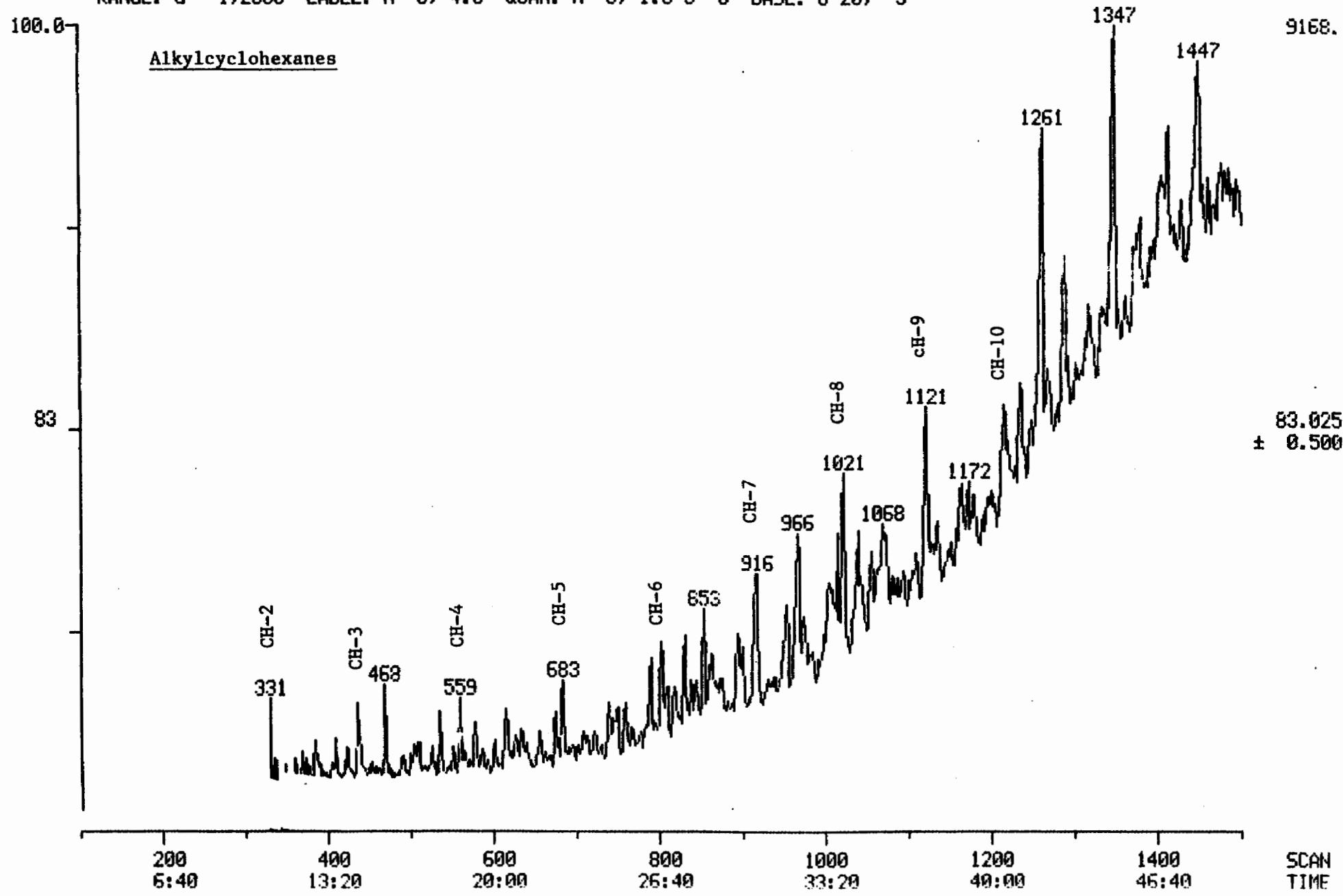


Figure 24: Mass chromatogram of alkylcyclohexanes (m/z 83) obtained from Bunker C oil.

MASS CHROMATOGRAM

16/16/94 16:36:00

SAMPLE: HENEQUEN

SAMPLE: VENEZUELAN BUNKER C FUEL OIL ASPHALTEN FREE
CONDE : 4 MIN 8 SEC 46 MIN TO 2186 (28 MIN) RD 1 E

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN
RANGE: 0 - 1.0000 A.I.E.TL II, 64.63000000000001

RANGE: C

10.1007/s00332-010-9000-1

Alkulaju

DATA: C5468 #1

CALL #: G5468 #1

SCANS 100 TO 1500

DRAKE

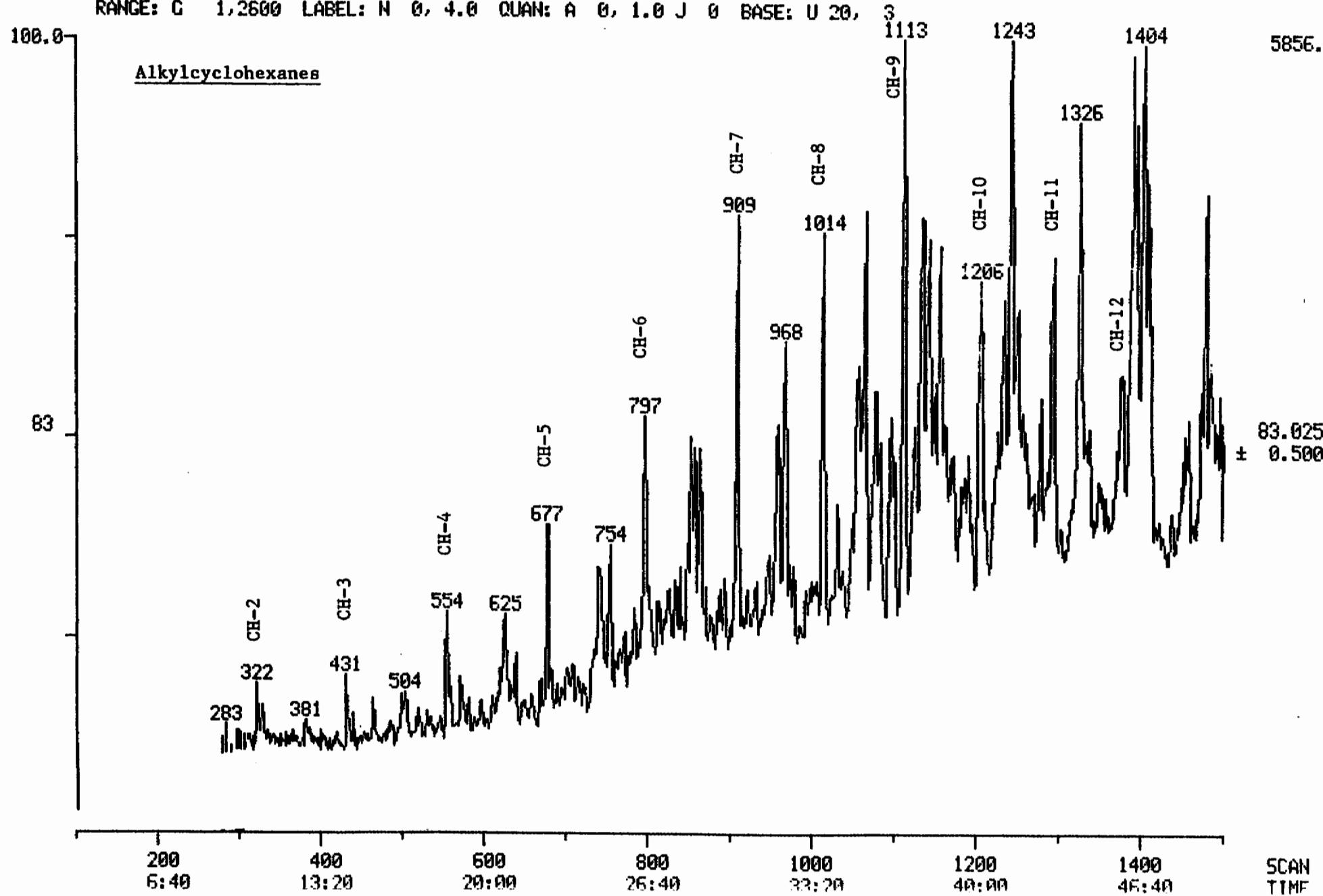


Figure 25: Mass chromatogram of alkylcyclohexanes (m/z 83) obtained from sample RS16 (0.5-1').

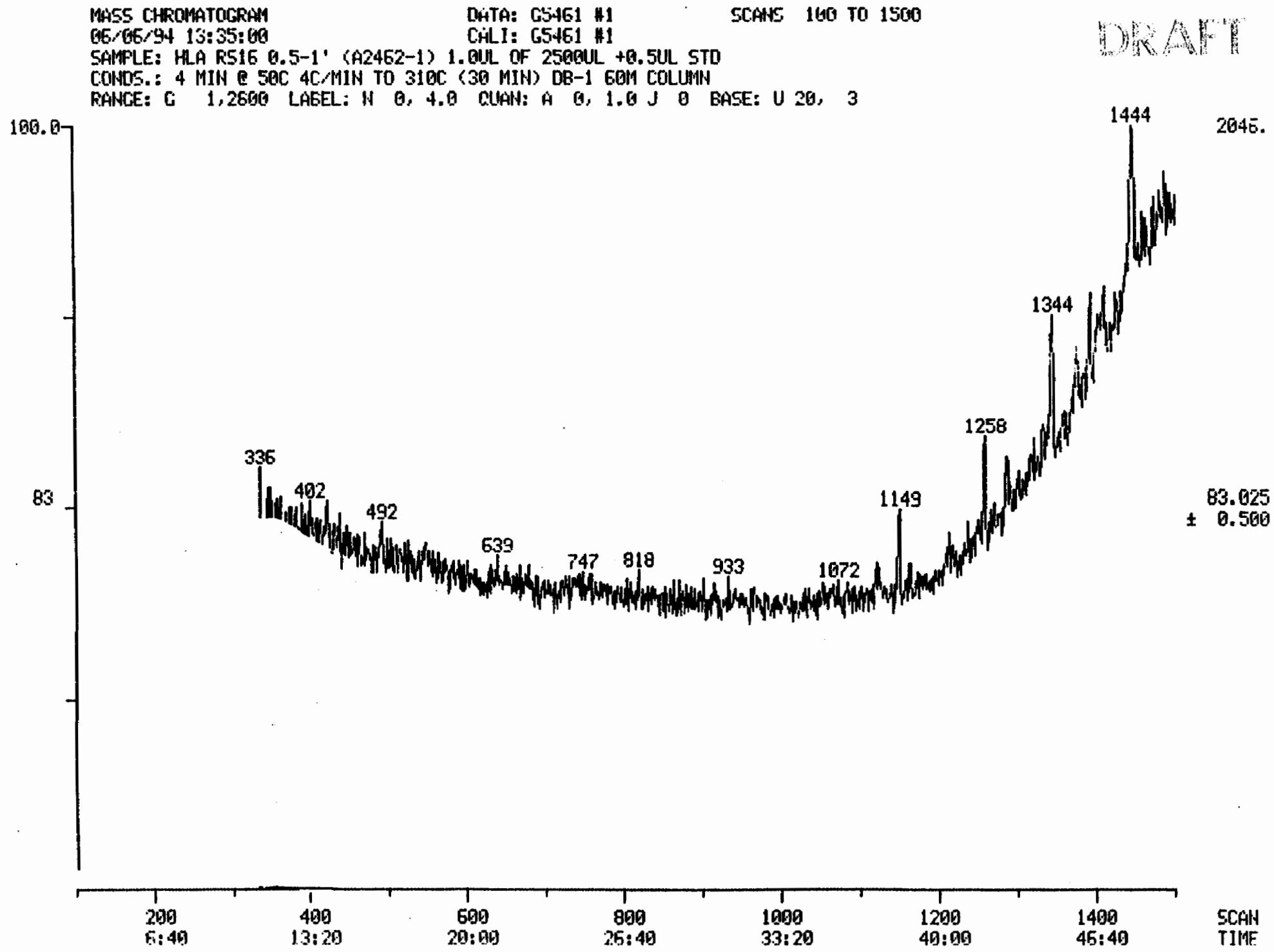


Figure 26: Mass chromatogram of alkylcyclolanes (m/z 83) obtained from sample RS14 (1-1.5').

MASS CHROMATOGRAM

06/06/94 15:26:00

DATA: C54G3 #1

CHL I: G5463 #1

SCANS 100 TO 1500

SAMPLE: HLA RS14 1-1.5' (82452-3) 1.2UL OF 421UL +0.5UL STD

CONDNS.: 4 MIN @ 50°C, 4°C/MIN TO 310°C (30 MIN) DB-1 FIDM COLUMN

CONCERN: 4 WIN & 300 4C/HIN 10-3100 (30 WIN) DE 1 can COLORANT
PENCE: G 1-2600 LABEL: N 0-1-0 QUAN: 0 0-1-0-1-0

RANGE: 0 1,2000 LABEL: H 0, 4.0 COUNT: H 0, 1.0 0 0 BASE: 0 200 3

ESK AFT

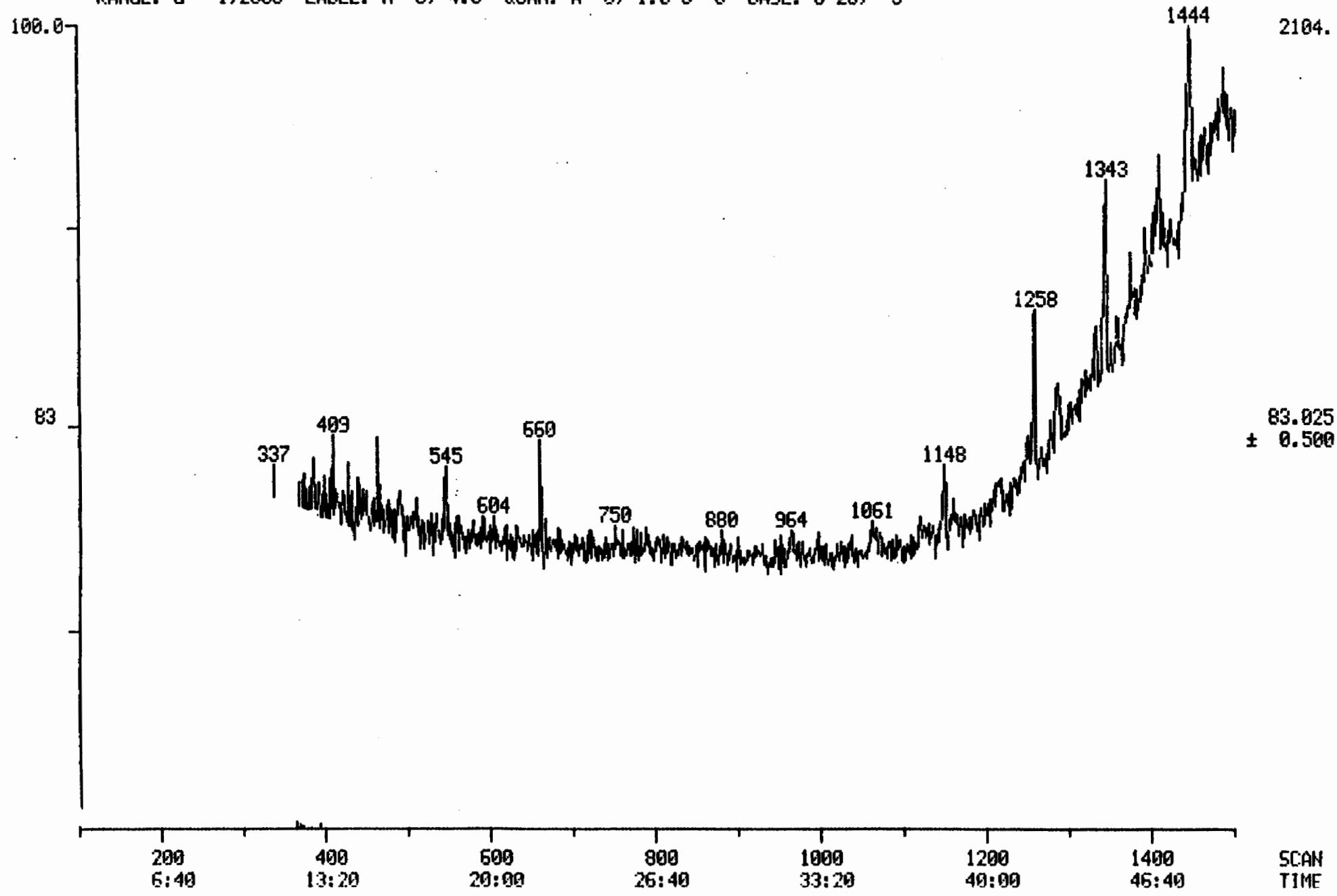


Figure 27: Mass chromatogram of alkylcyclohexanes (m/z 83) obtained from sample RS16 (20-20.5').

MASS CHROMATOGRAM

06/06/94 11:49:00

887 00734 11:45:08

SAMPLE: HLA RS16 20-26.5' (A2462-2) 1.2UL OF 6000UL +0.5UL STD

CONDNS.: 4 MIN @ 50°C 4°C/MIN TO 310°C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 9,4.9 QUAN: A 0: 1-8 J 8

RANGE: 0 172000 LABEL: H 0, 4.0 COUNT: H 0, 1.0 0 0 BASE: 0 0, 3

SCANS 100 TO 1500

DATA: G5462 #1

CHI 1: G5462 #1

DKAFT

3056A.

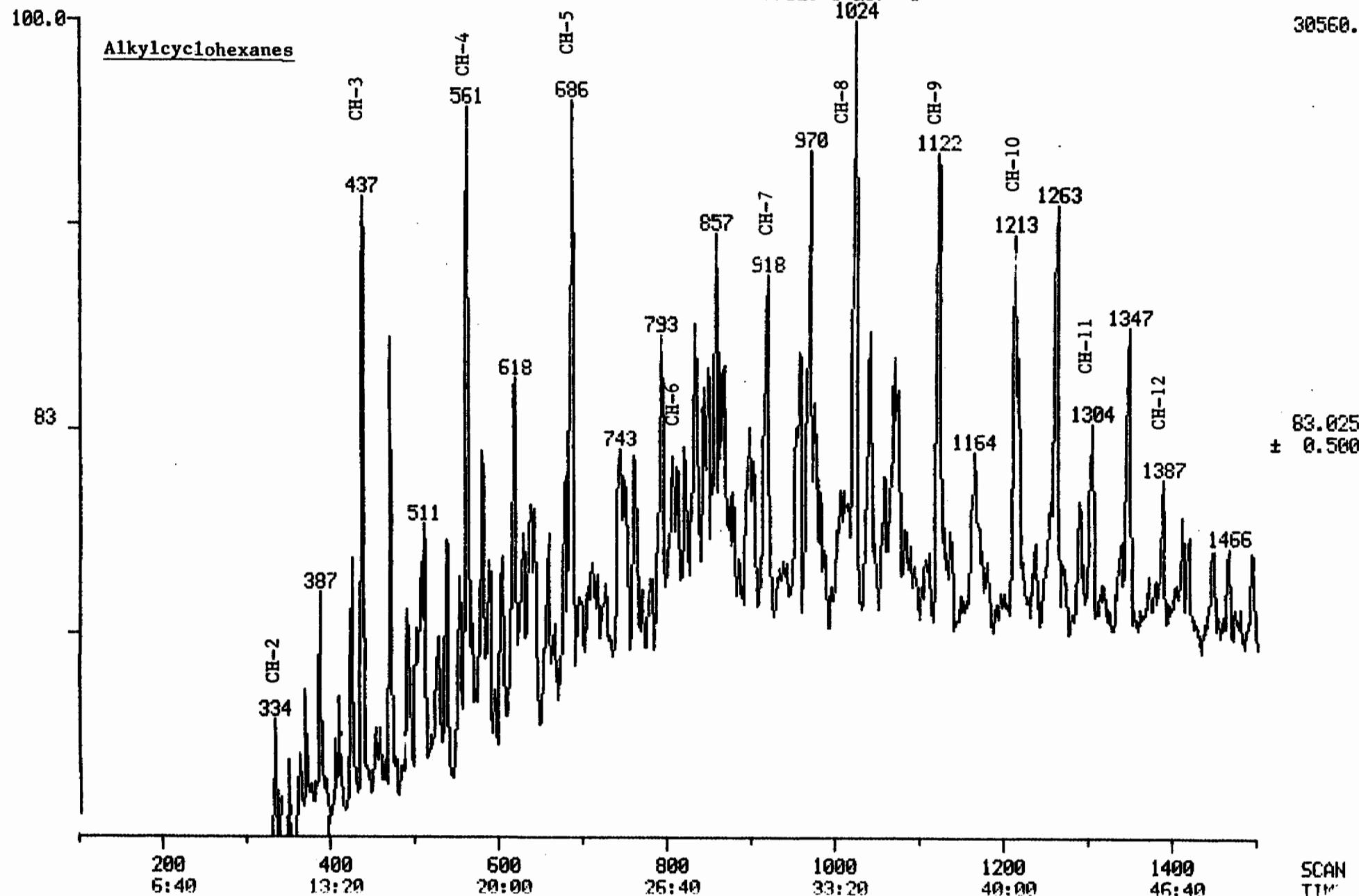


Figure 28: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS17 (5.5-6').

MASS CHROMATOGRAM

06/07/94 13:57:00

DATA: GS464 #1

CALI: GS464 #1

SCANS 200 TO 1600

SAMPLE: HLA RS17 5.5-6' (A2462-4) 0.4UL OF 4930UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: C 1.2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DRAFT

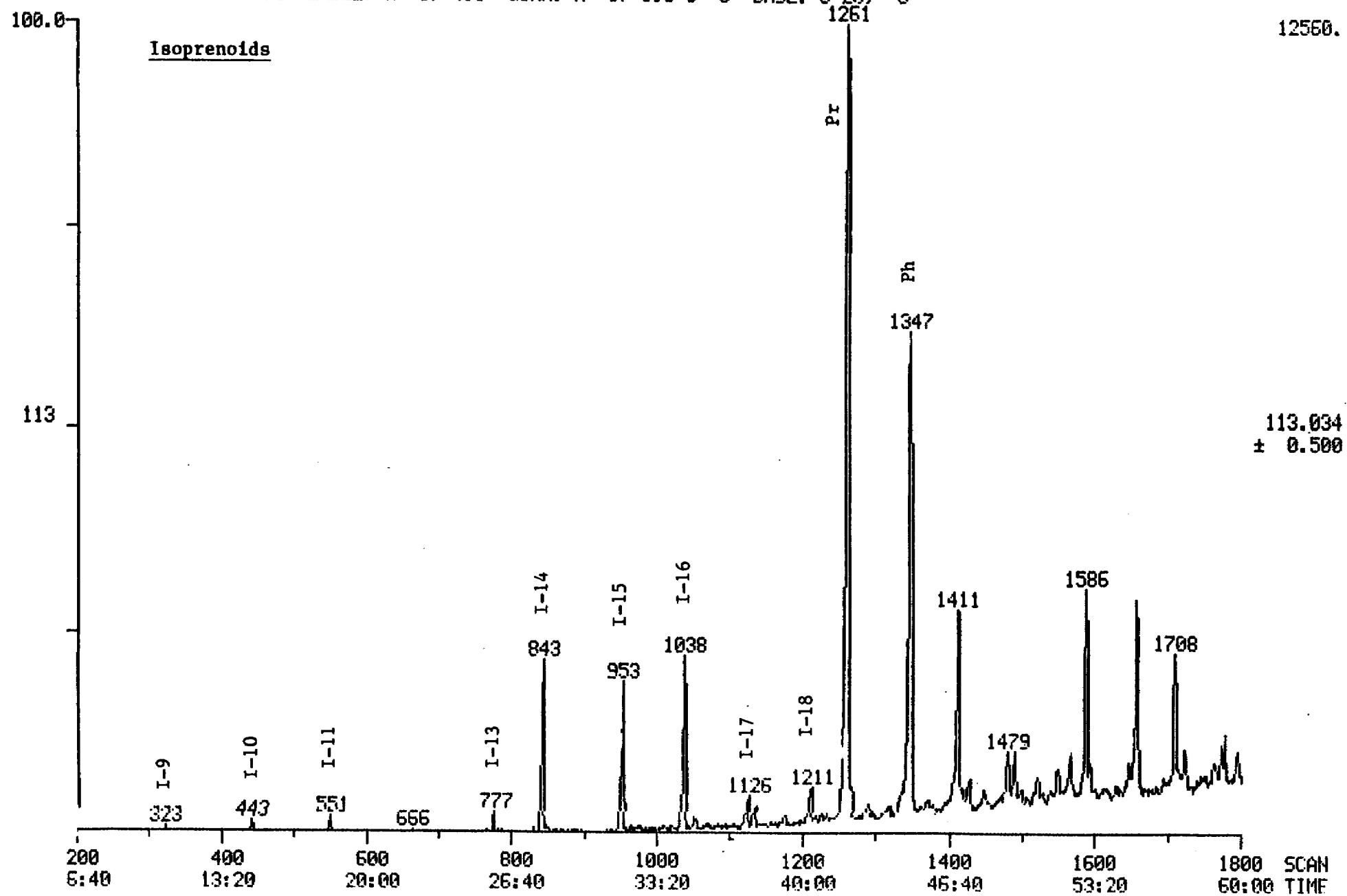


Figure 29: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS15 (15.5-16').

MASS CHROMATOGRAM

06/07/94 12:09:00

DATA: G5465 #1

SCANS 200 TO 1800

CALI: G5465 #1

SAMPLE: HLA RS15 15.5-16' (A2462-5) 0.5UL OF 4310UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2000 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DRAFT

28928.

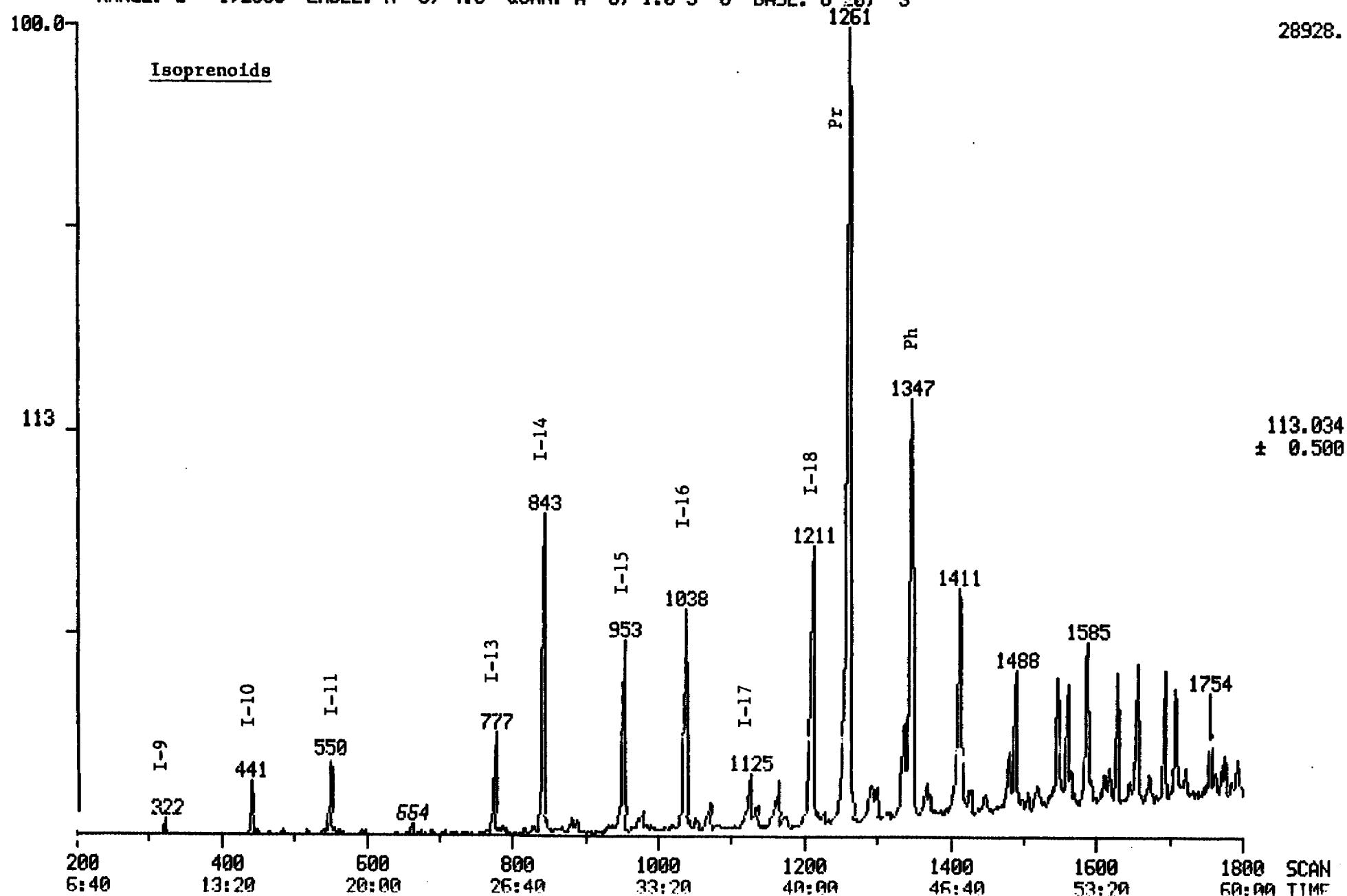


Figure 30: Mass chromatogram of isoprenoids (m/z 113) obtained from Bunker C oil.

MASS CHROMATOGRAM

12/13/93 15:51:00

DATA: G5259 #1

CALI: G5259 #3

SCANS 1 TO 1400

SAMPLE: BUNKER C OIL (VENEZUELA) ALI

COND.: 5 MIN @ 100C 4C/MIN TO 220C 2C/MIN TO 320C (25 MIN) DB-1 60M COL

RANGE: G 1.3000 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

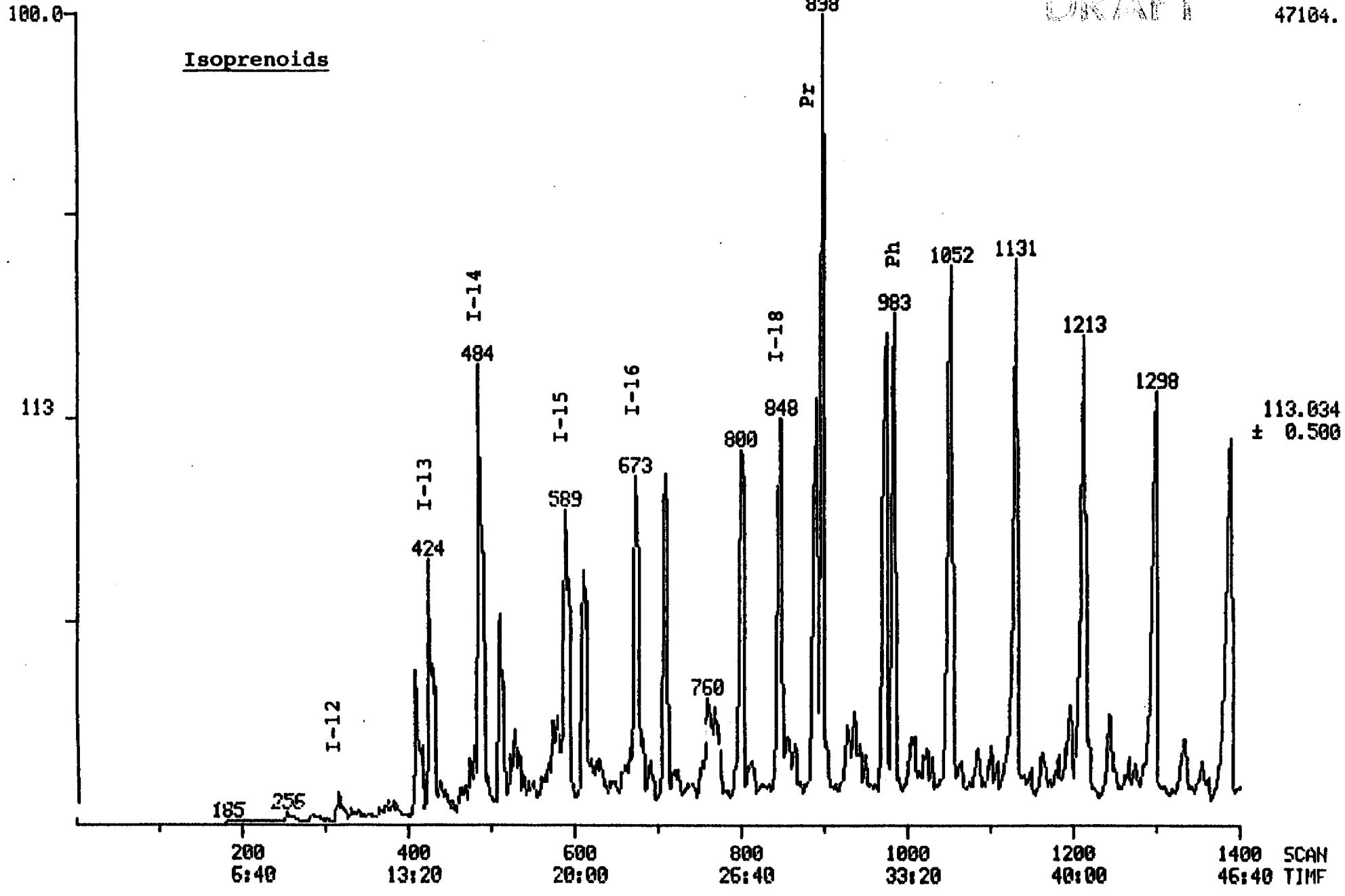


Figure 31: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS16 (0.5-1').

MASS CHROMATOGRAM

06/06/94 13:35:00

DATA: G5461 #1

CHLI: G5461 #1

SCANS 200 TO 1800

SAMPLE: HLA RS16 0.5-1' (A2462-1) 1.0UL OF 2500UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2600 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DRAFT

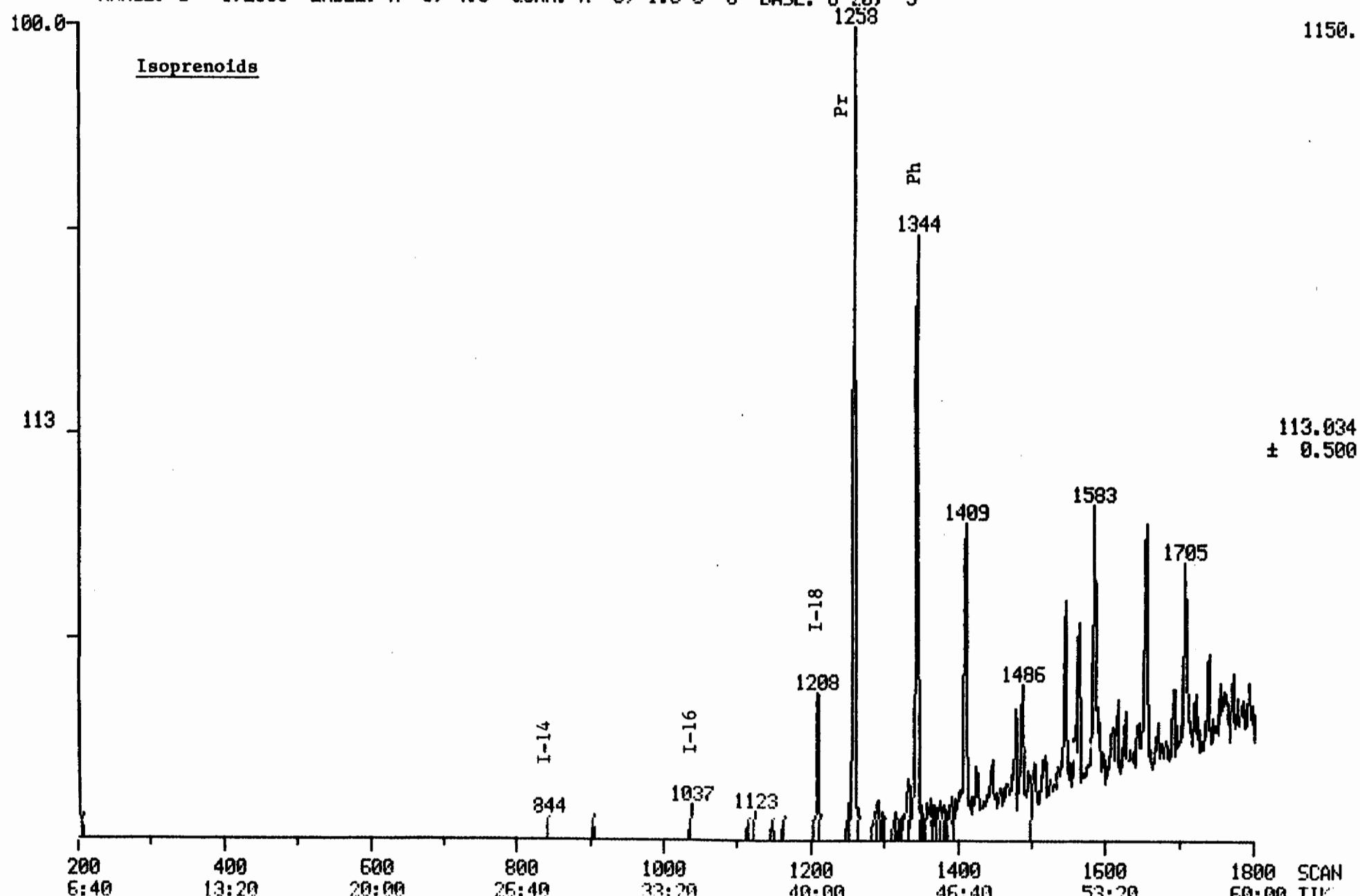


Figure 32: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS14 (1-1.5').

MASS CHROMATOGRAM

06/06/94 15:26:00

DATA: G5463 #1

CALI: G5463 #1

SCANS 200 TO 1800

SAMPLE: HLA RS14 1-1.5' (A2462-3) 1.2UL OF 421UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: C 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DRAFT

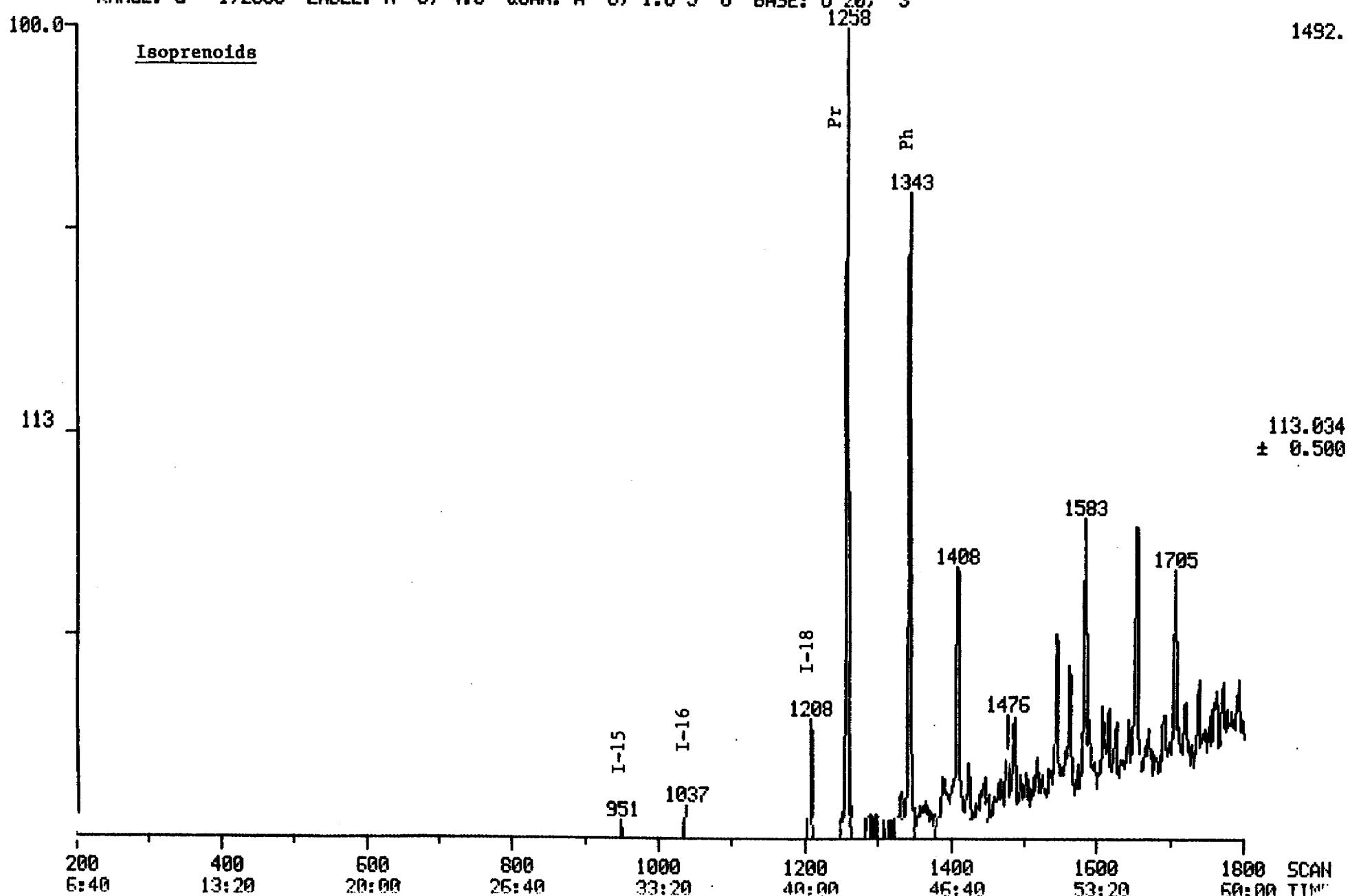


Figure 33: Mass chromatogram of isoprenoids (m/z 113) obtained from sample RS16 (20-20.5').

MASS CHROMATOGRAM

06/06/94 11:49:00

DATA: GS462 #1

CHRL: GS462 #1

SCANS 200 TO 1800

SAMPLE: HLA RS16 20-20.5' (A2462-2) 1.2UL OF 6000UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

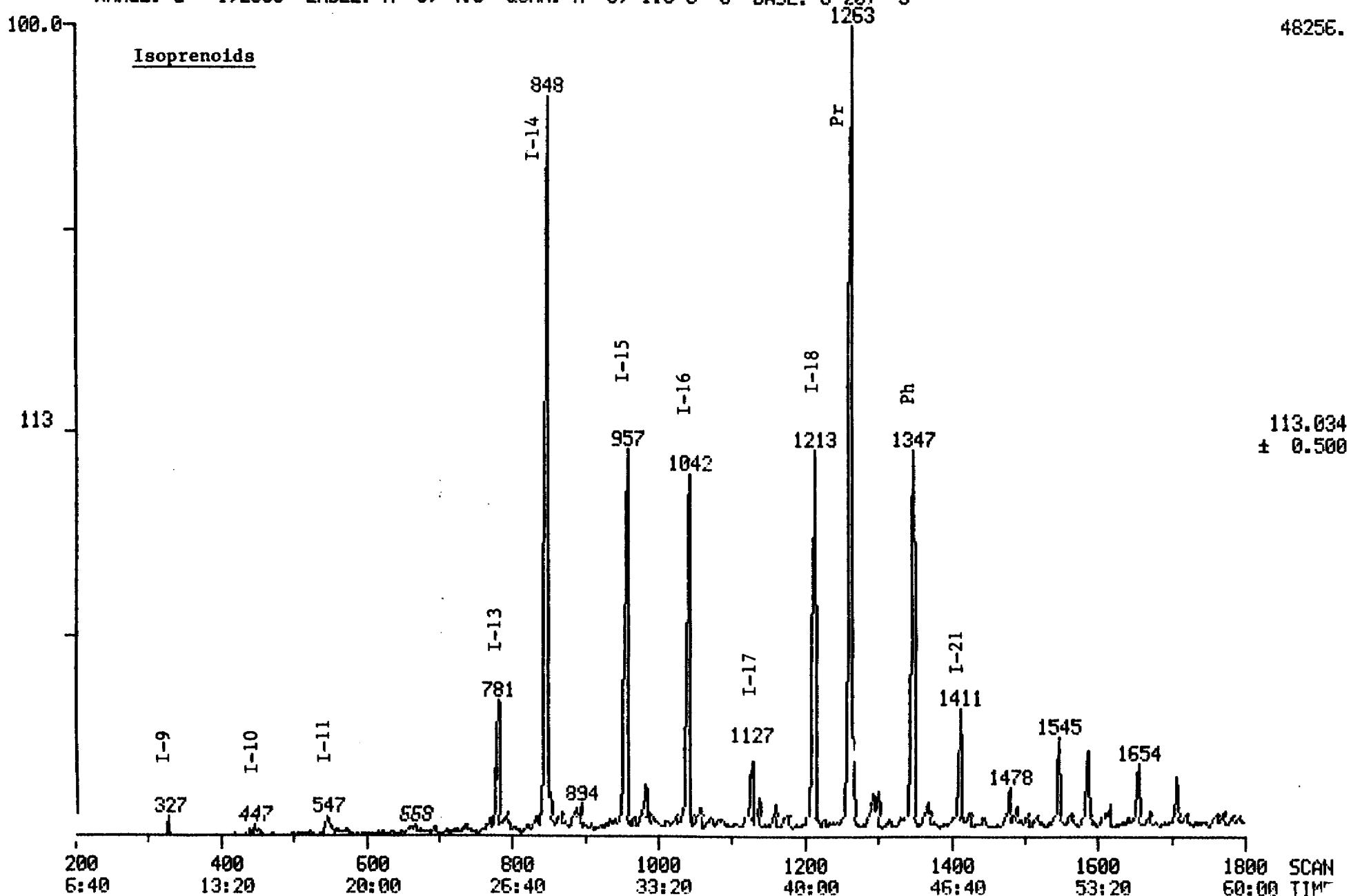


Figure 34: Mass chromatogram of bicyclane (m/z 123) obtained from sample RS16 (20-20.5').

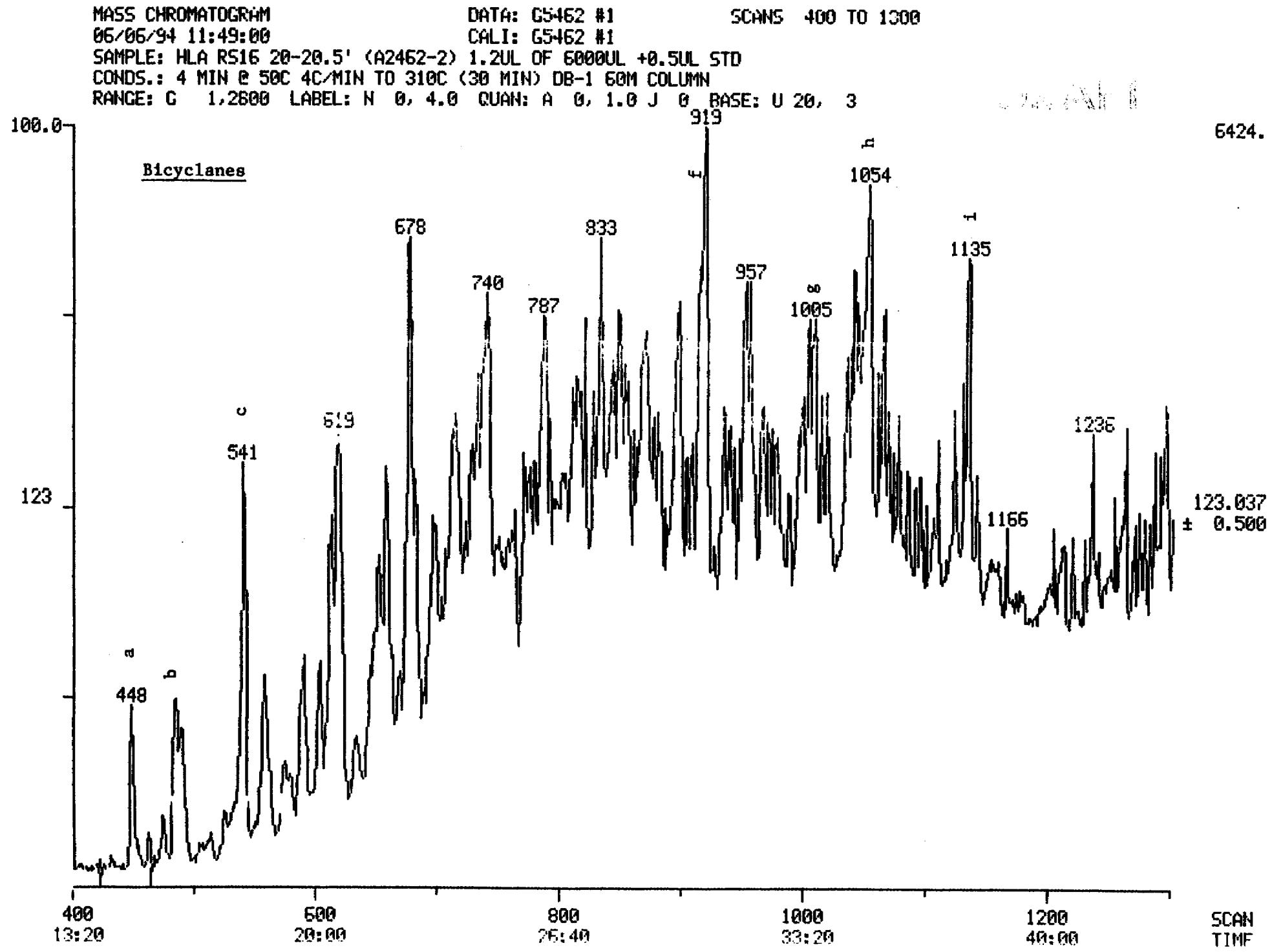


Figure 35: Mass chromatogram of bicyclanes (m/z 123) obtained from Jet A.

MASS CHROMATOGRAM

04/21/94 9:55:00

SAMPLE: VAN NUYS AIRPORT JET-A X50 1.0UL INJ

COND.: 4 MIN @ 50C 4C/MIN TO 310C (25 MIN) DB-1 60M COLUMN

RANGE: G 1,2200 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: G5392 #1

CHLI: G5392 #3

SCANS 400 TO 1300

Bicyclanes

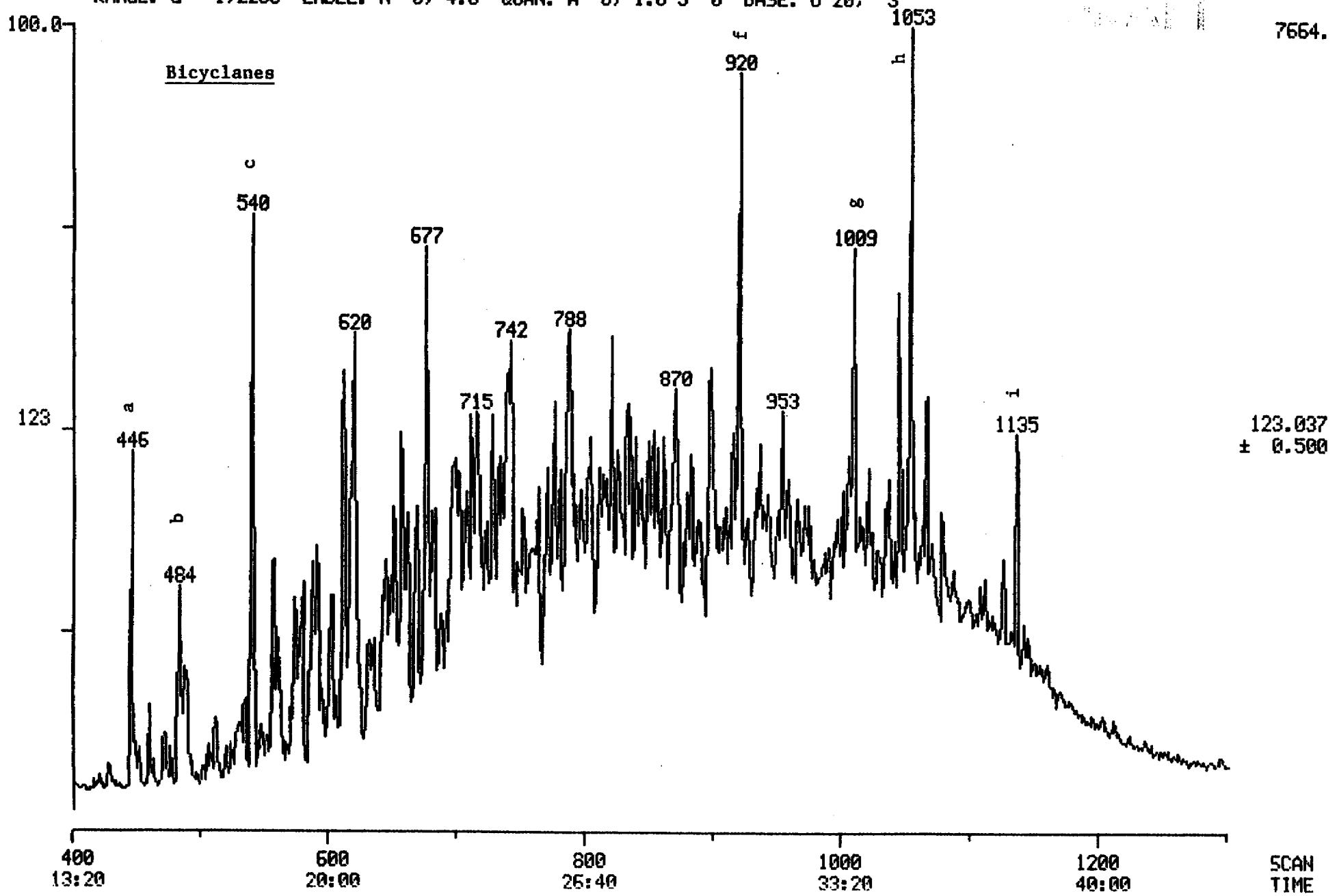


Figure 36: Mass chromatogram of bicyclanes (m/z 123) obtained from sample RS17 (5.5-6').

MASS CHROMATOGRAM

06/07/94 13:57:00

DATA: G5464 #1

CHRL: G5464 #1

SCANS 400 TO 1300

SAMPLE: HLA RS17 5.5-6' (A2462-4) 0.4UL OF 4930UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

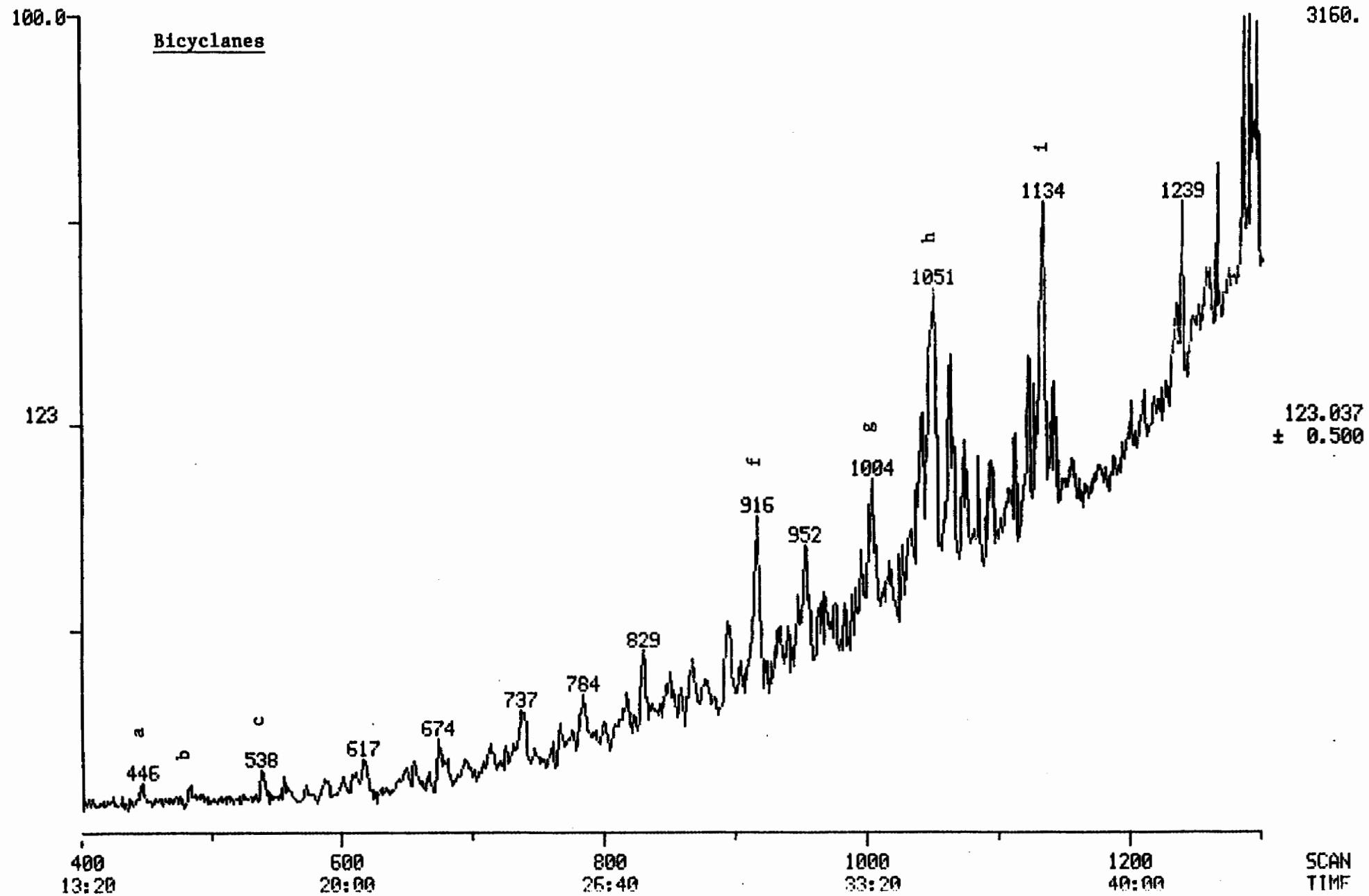


Figure 37: Mass chromatogram of bicyclanes (m/z 123) obtained from sample RS15 (15.5-16').

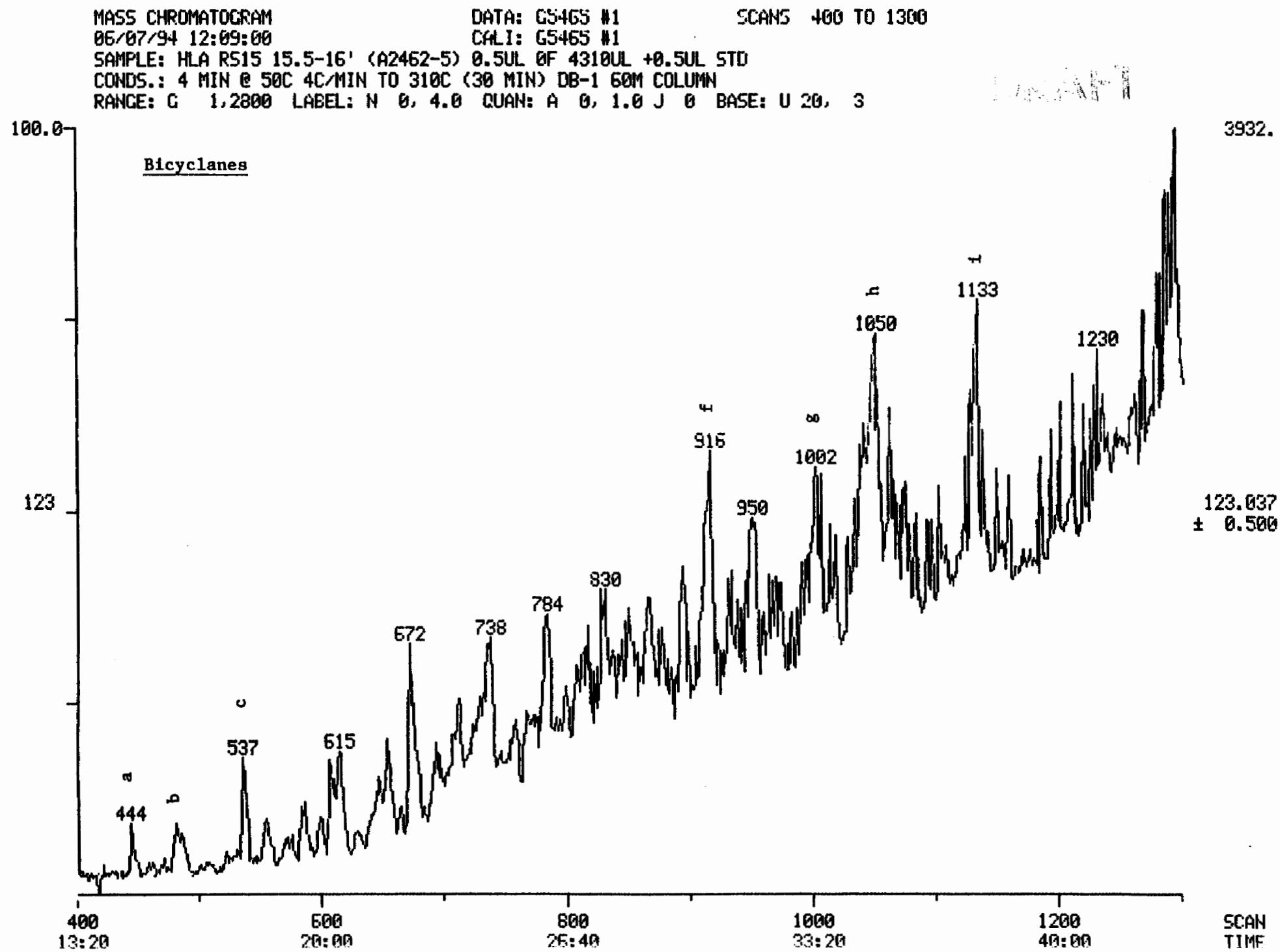


Figure 38: Mass chromatogram of terpanes (m/z 191) obtained from sample RS16 (0.5-1').

MASS CHROMATOGRAM

06/06/94 13:35:00

DATA: GS461 #1

CALI: GS461 #1

SCANS 1525 TO 2600

SAMPLE: HLA RS16 0.5-1' (A2462-1) 1.0UL OF 2500UL +0.5UL STD

COND.: 4 MIN @ 50C 40/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2600 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

2183

5968.

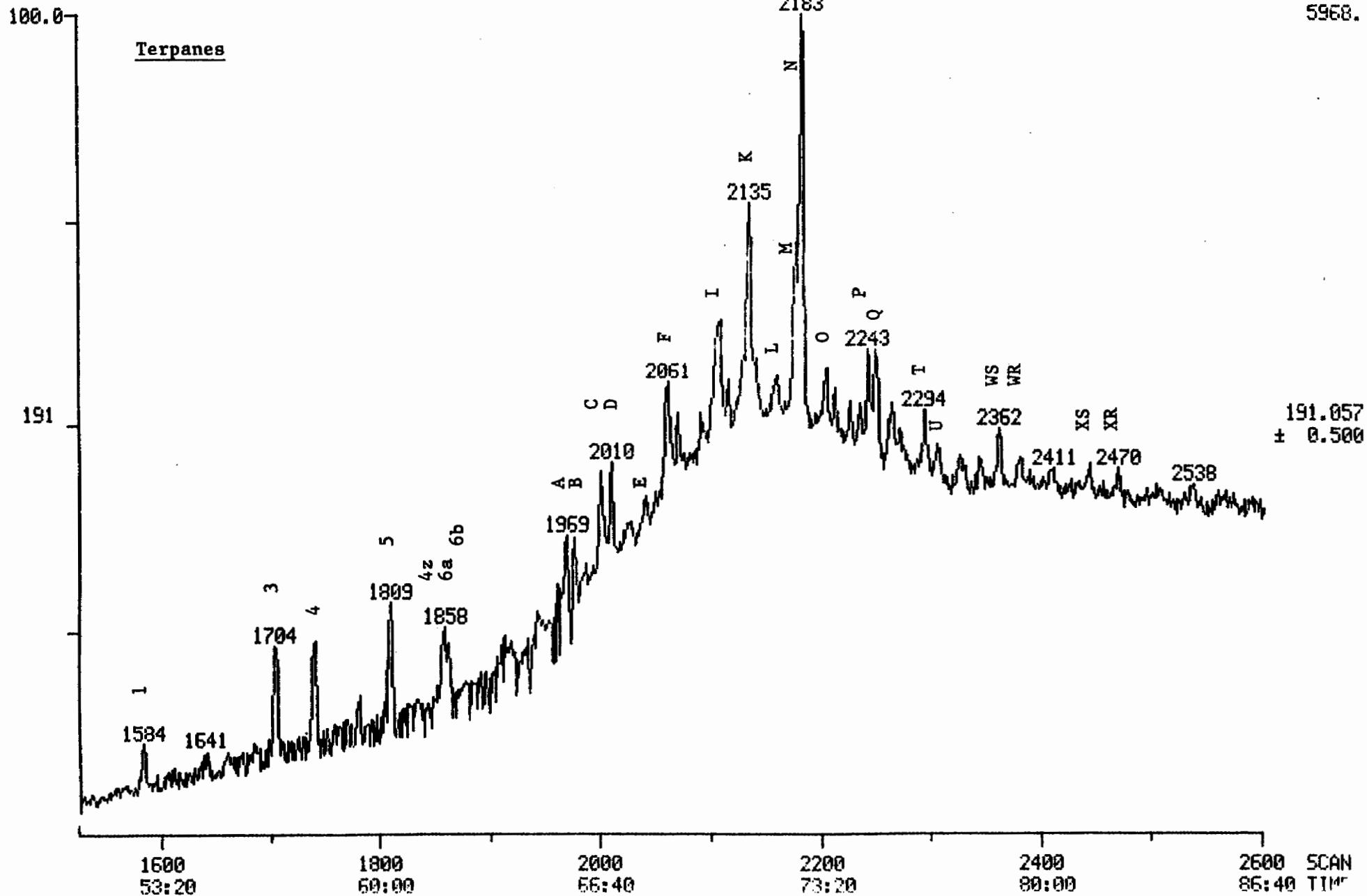


Figure 39: Mass chromatogram of terpanes (m/z 191) obtained from sample RS16 (20-20.5').

MASS CHROMATOGRAM

06/06/94 11:49:00

DATA: G5462 #1

SCANS 1525 TO 2600

CALI: G5462 #1

SAMPLE: HLA RS16 20-20.5' (A2462-2) 1.2UL OF 6000UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

2182

9152.

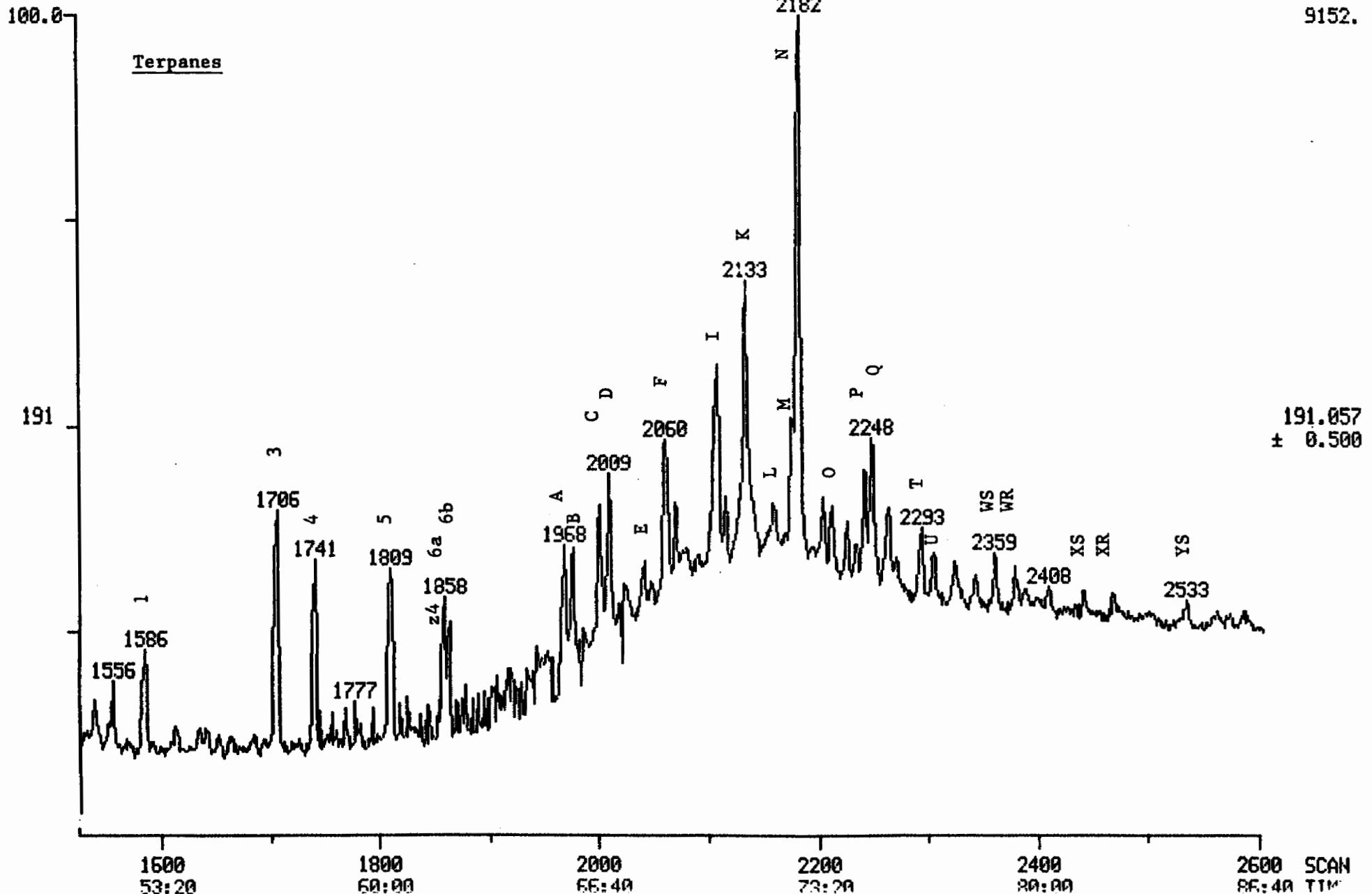


Figure 40: Mass chromatogram of terpanes (m/z 191) obtained from sample RS14 (1-1.5').

MASS CHROMATOGRAM

06/06/94 15:26:00

DATA: G5463 #1

SCANS 1525 TO 2600

CHRL: G5463 #1

SAMPLE: HLA RS14 1-1.5' (A2462-3) 1.2UL OF 4210UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

2183

6152.

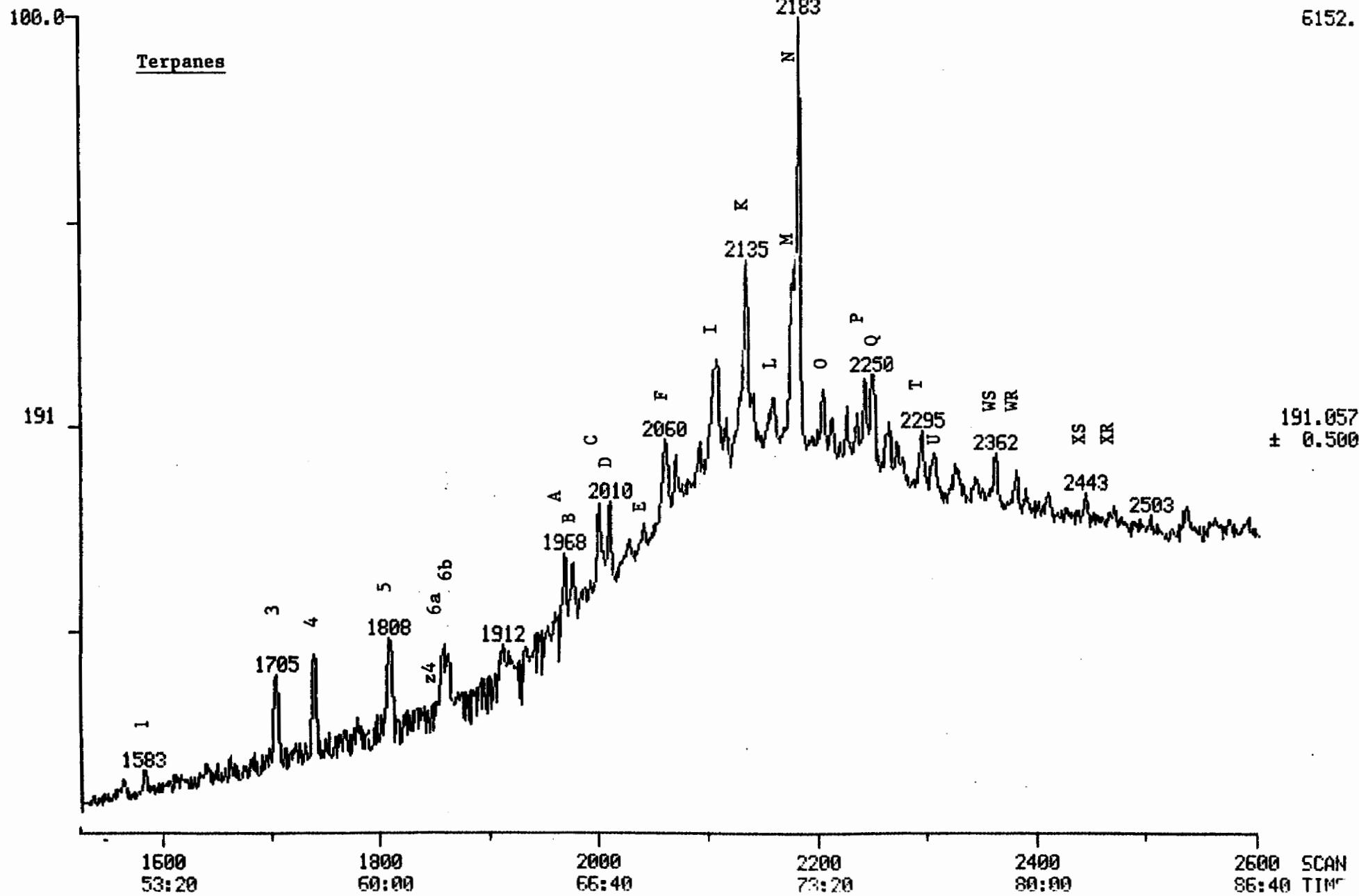


Figure 41: Mass chromatogram of terpanes (m/z 191) obtained from sample RS17 (5.5-6').

MASS CHROMATOGRAM

06/07/94 13:57:00

DATA: G5464 #1

CALI: G5464 #1

SCANS 1525 TO 2600

SAMPLE: HLA RS17 5.5-6' (A2462-4) 0.4UL OF 4930UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2600 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, S

2185

10880.

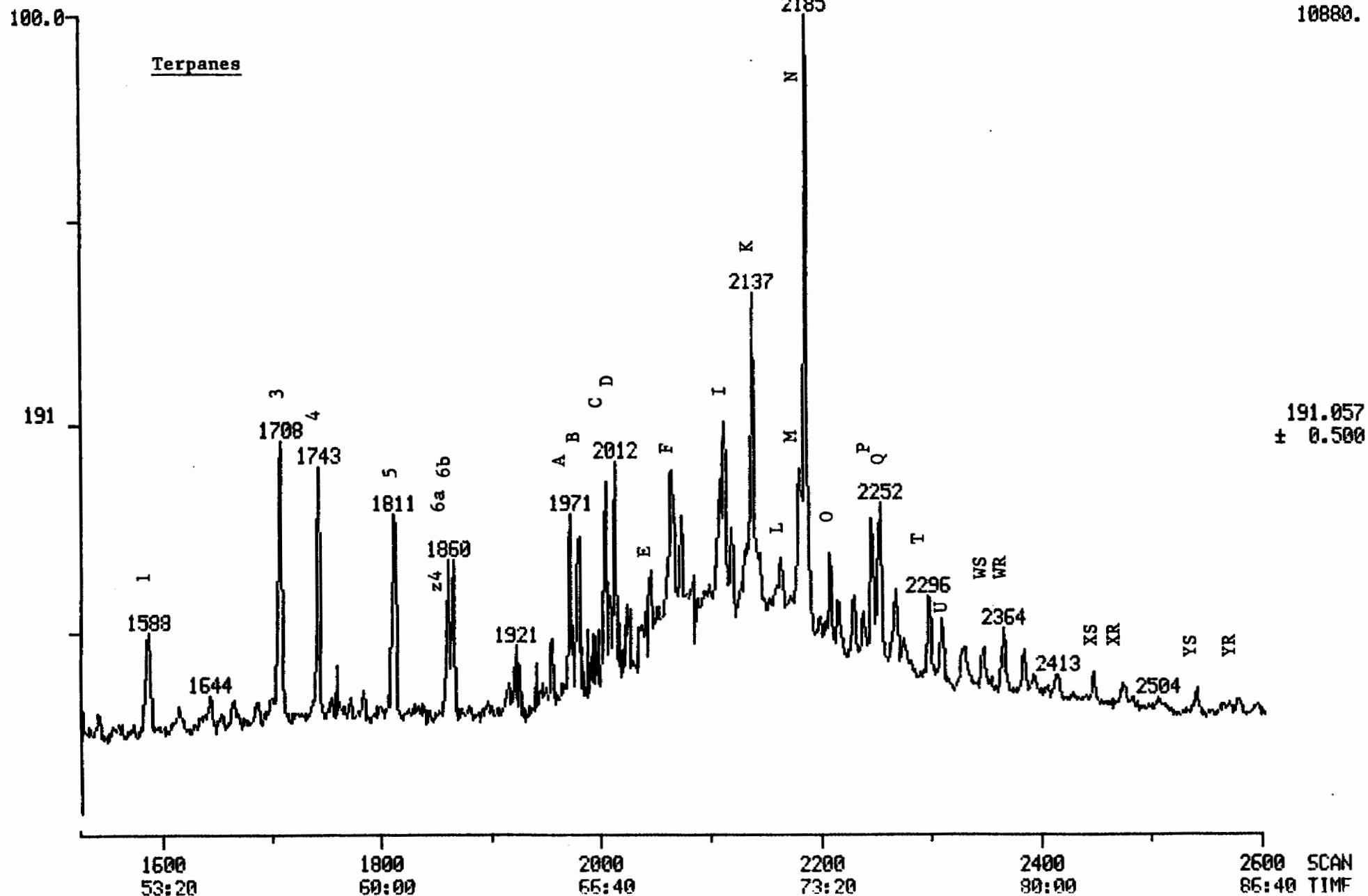


Figure 42: Mass chromatogram of terpanes (m/z 191) obtained from sample RS15 (15.5-16').

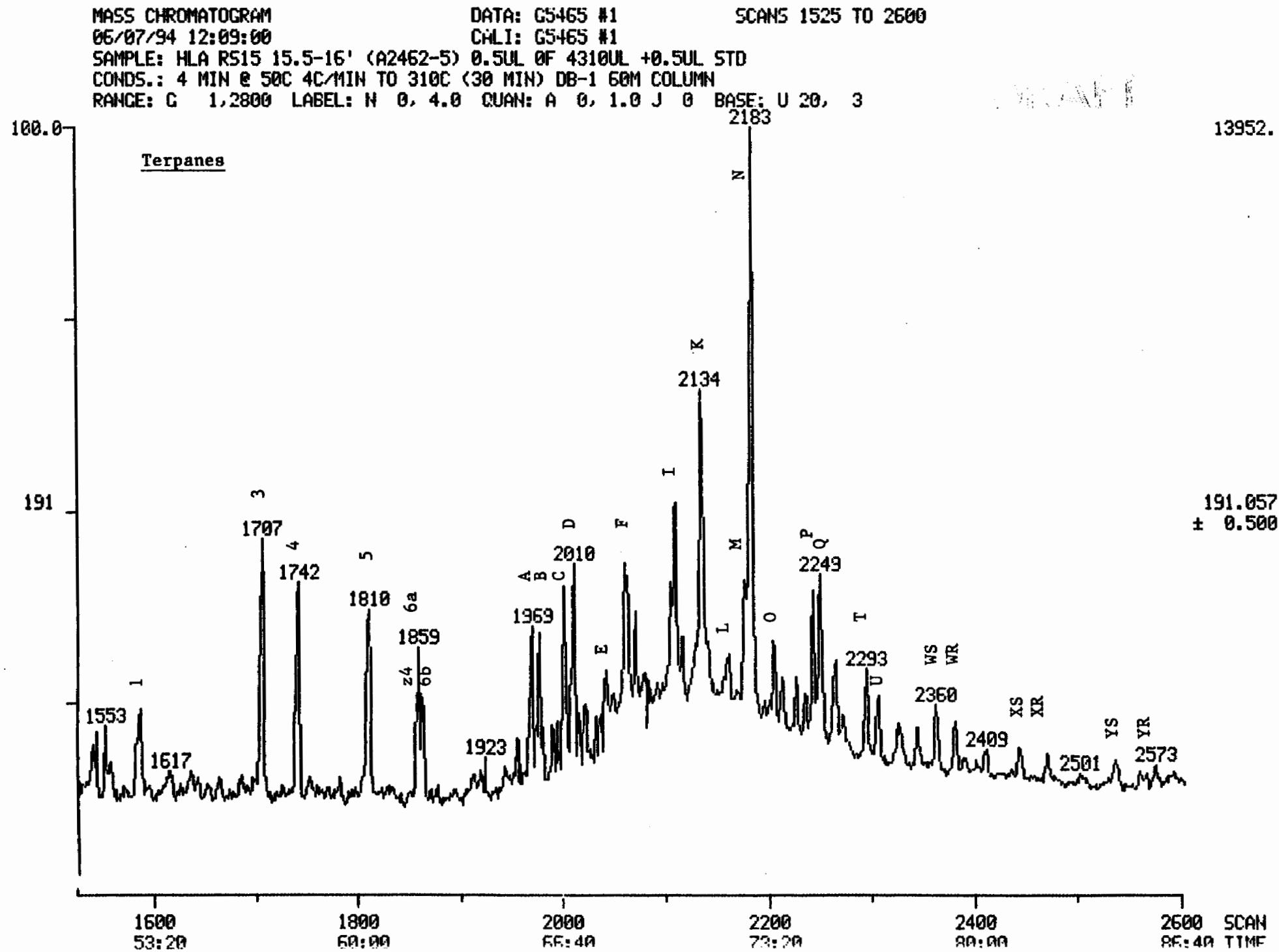


Figure 43: Mass chromatogram of terpanes (m/z 191) obtained from Bunker C oil.

MASS CHROMATOGRAM

06/09/94 11:12:00

DATA: G5470 #1

CALI: G5470 #3

SCANS 1600 TO 2675

SAMPLE: VENEZUELAN BUNKER C FUEL OIL ASPHALTEN FREE

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,3000 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

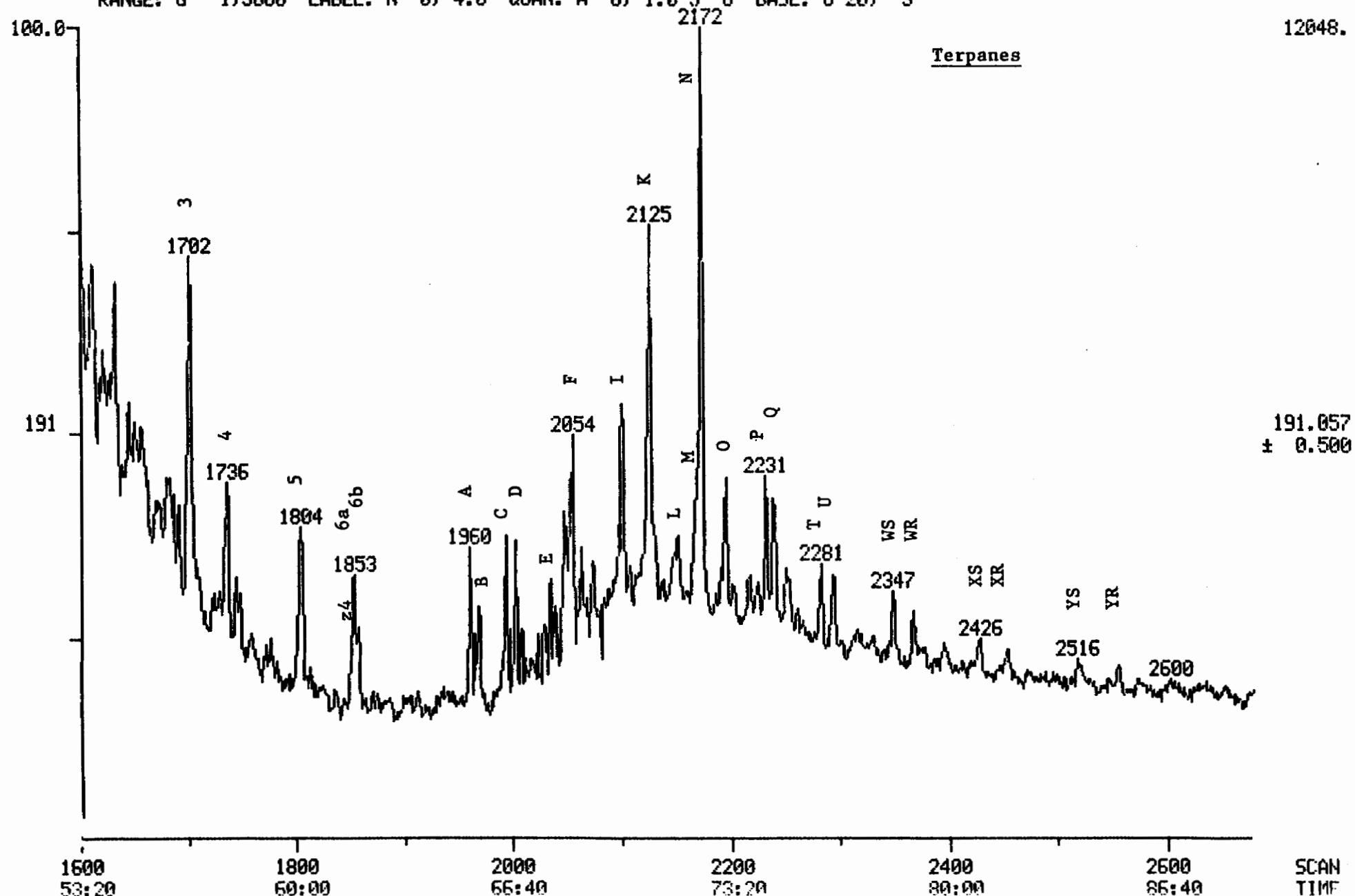


Figure 44: Mass chromatogram of sterane (m/z 217) obtained from sample RS16 (0.5-1').

MASS CHROMATOGRAM

06/06/94 13:35:00

DATA: GS461 #1

SCANS 1850 TO 2200

CALI: GS461 #1

SAMPLE: HLA RS16 0.5-1' (A2462-1) 1.0UL OF 2500UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2600 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

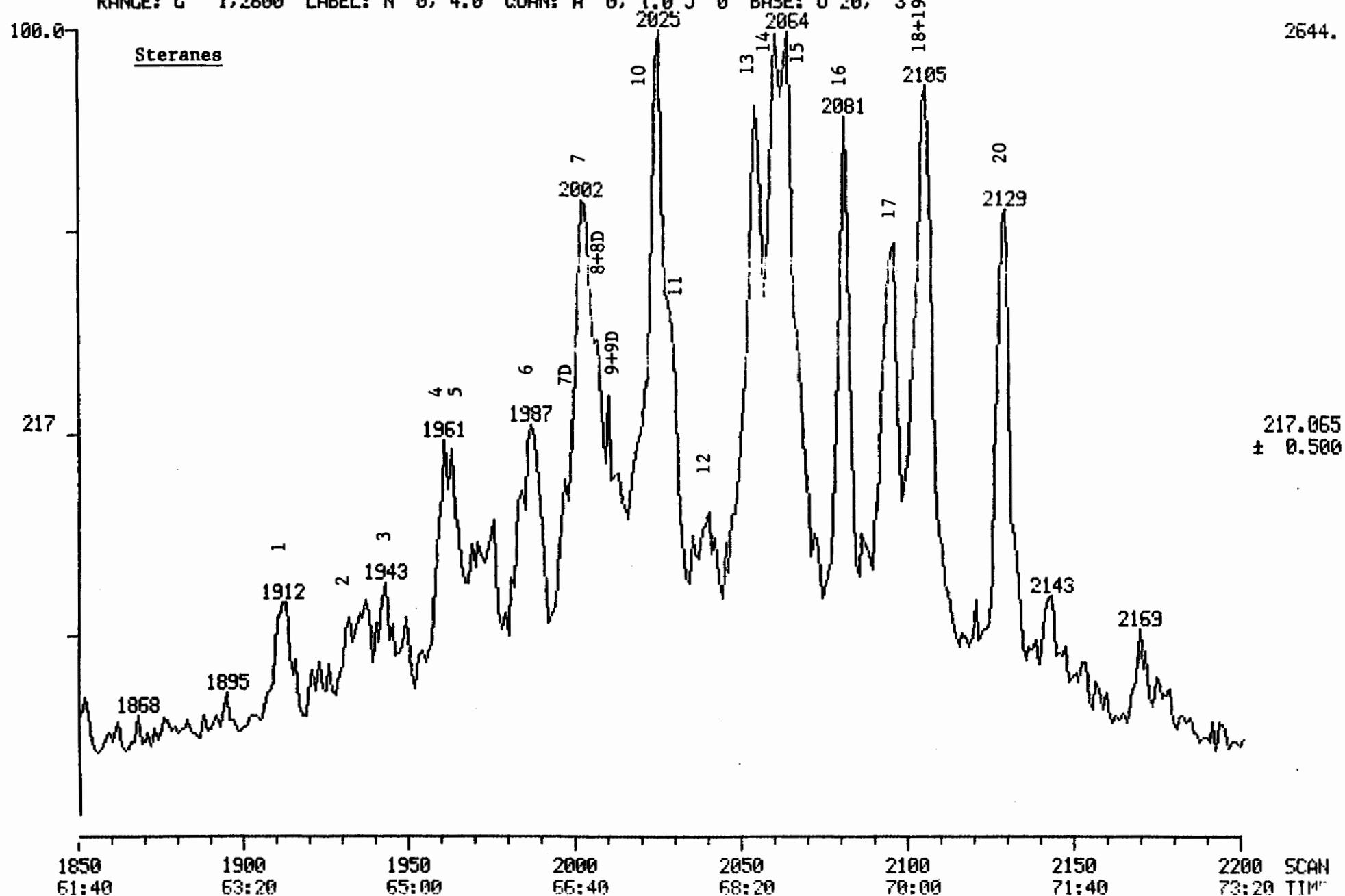


Figure 45: Mass chromatogram of steranes (m/z 217) obtained from sample RS16 (20-20.5').

MASS CHROMATOGRAM

06/06/94 11:49:00

DATA: G5462 #1

SCANS 1050 TO 2200

CALI: G5462 #1

SAMPLE: HLA RS16 20-20.5' (A2462-2) 1.2UL OF 6000UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

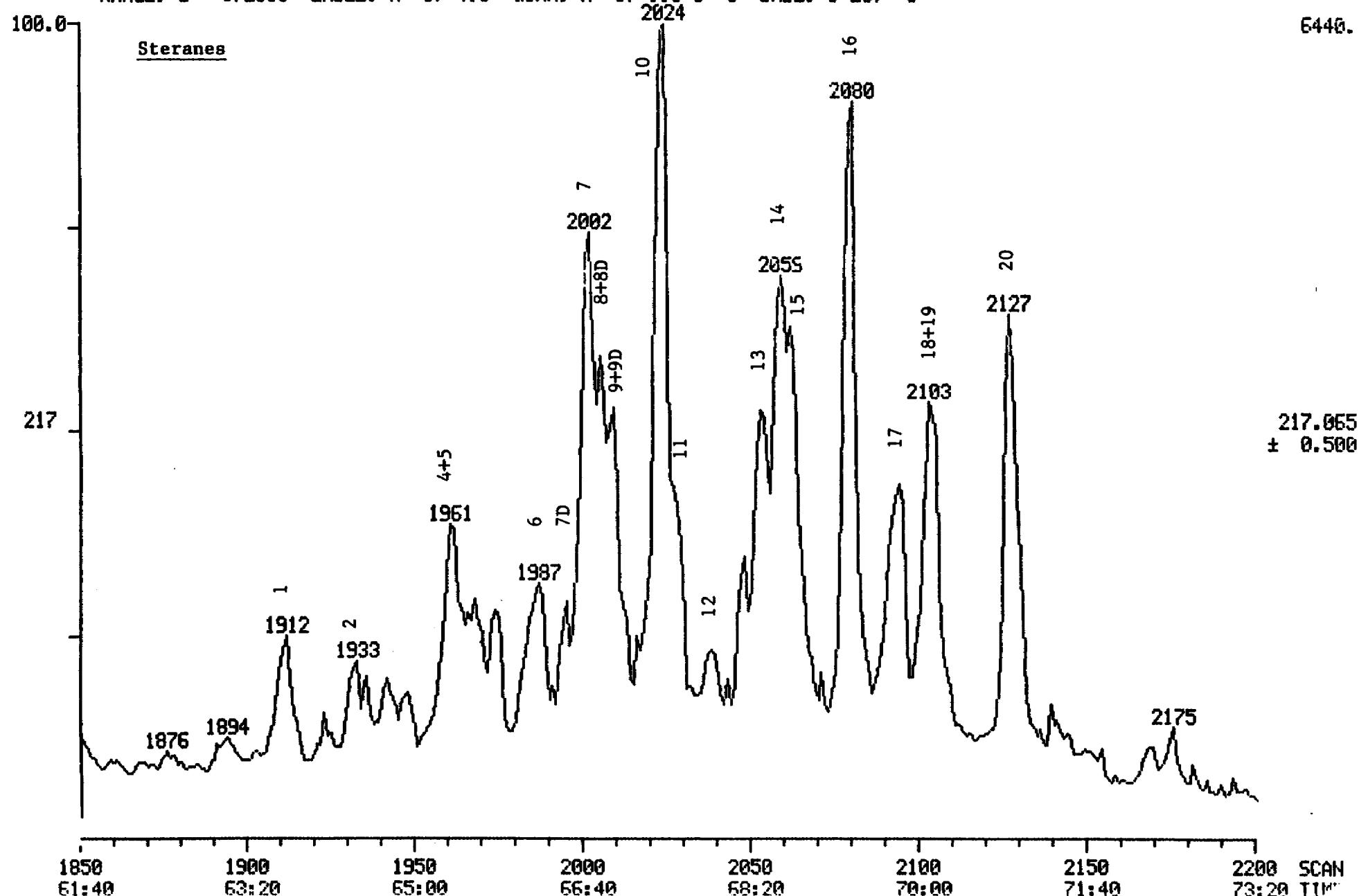


Figure 46: Mass chromatogram of sterane (m/z 217) obtained from sample RS14 (1-1.5').

MASS CHROMATOGRAM

06/06/94 15:26:00

DATA: G5463 #1

SCANS 1850 TO 2200

CHRLI: G5463 #1

SAMPLE: HLA RS14 1-1.5' (A2462-3) 1.2UL OF 4210UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2600 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

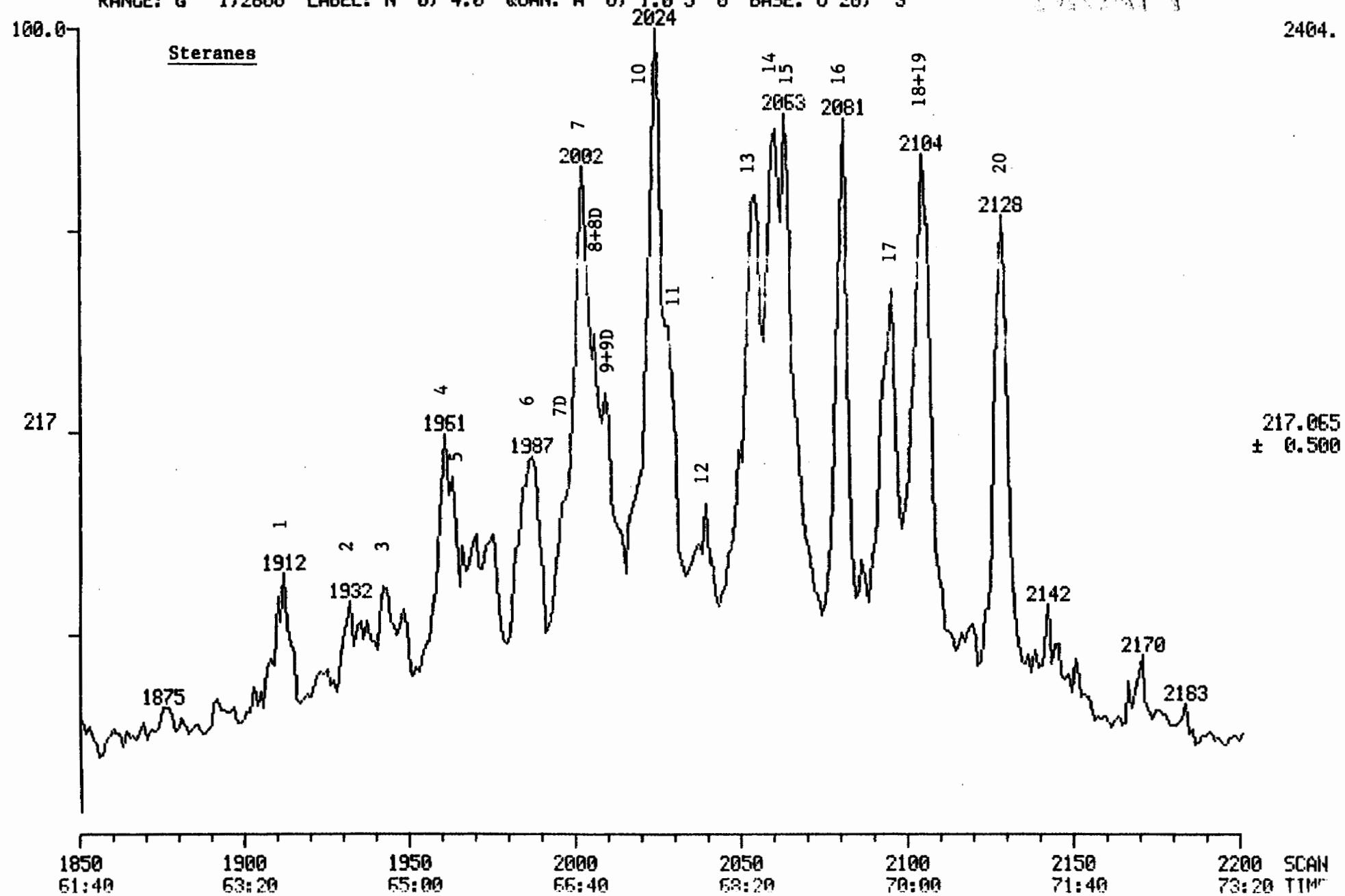


Figure 47: Mass chromatogram of steranes (m/z 217) obtained from sample RS17 (5.5-6').

MASS CHROMATOGRAM

06/07/94 13:57:00

DATA: G5464 #1

CALI: G5464 #1

SCANS 1850 TO 2200

SAMPLE: HLA RS17 5.5-6' (A2462-4) 0.4UL OF 4930UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: C 1,2000 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

2027

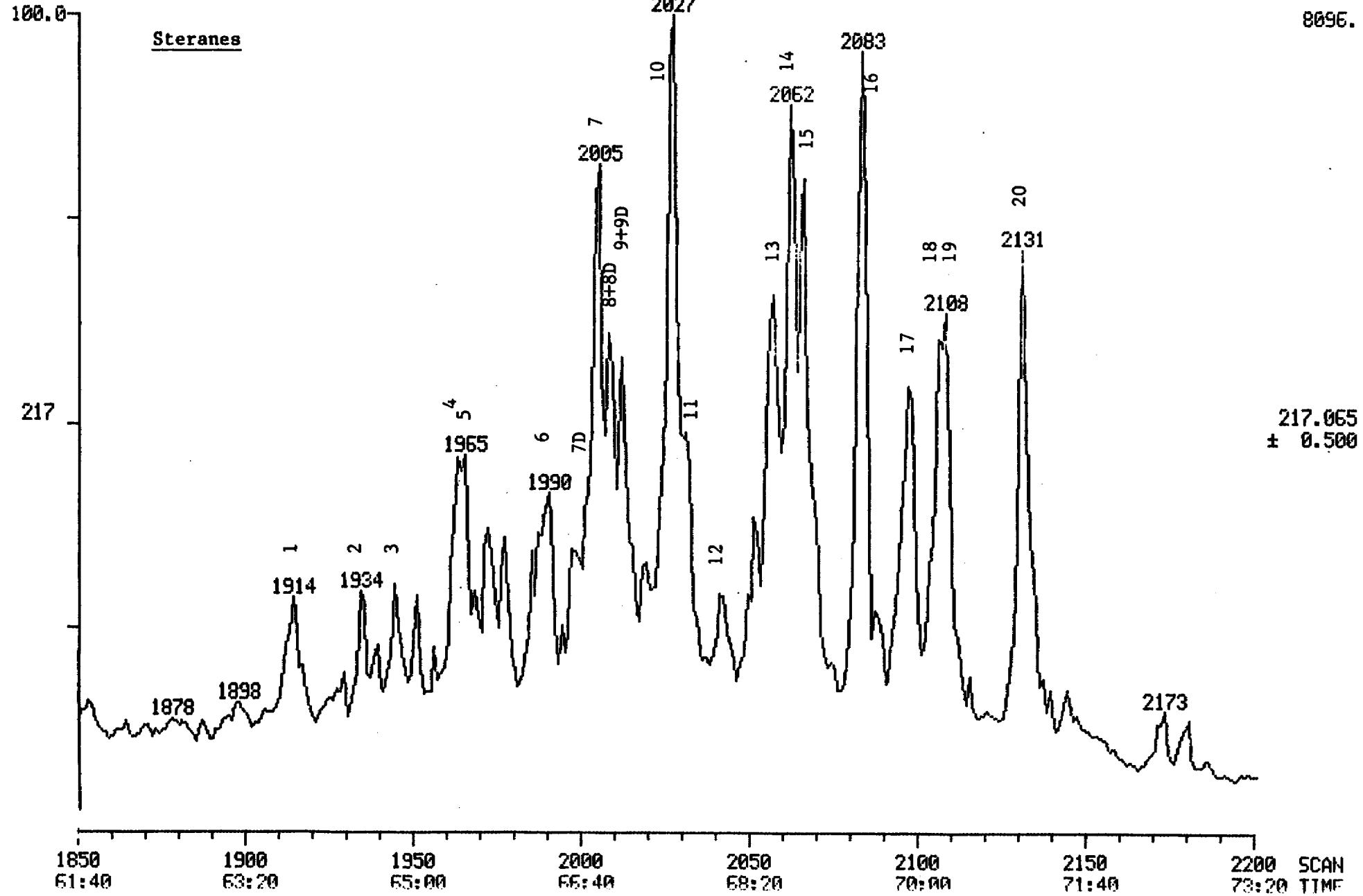


Figure 48: Mass chromatogram of steranes (m/z 217) obtained from sample RS15 (15.5-16').

MASS CHROMATOGRAM

06/07/94 12:09:00

DATA: G5465 #1

SCANS 1050 TO 2200

CHLI: G5465 #1

SAMPLE: HLA RS15 15.5-16' (A2462-5) 0.5UL OF 4310UL +0.5UL STD

COND.: 4 MIN @ 50C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

RANGE: G 1,2800 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

2024

10512.

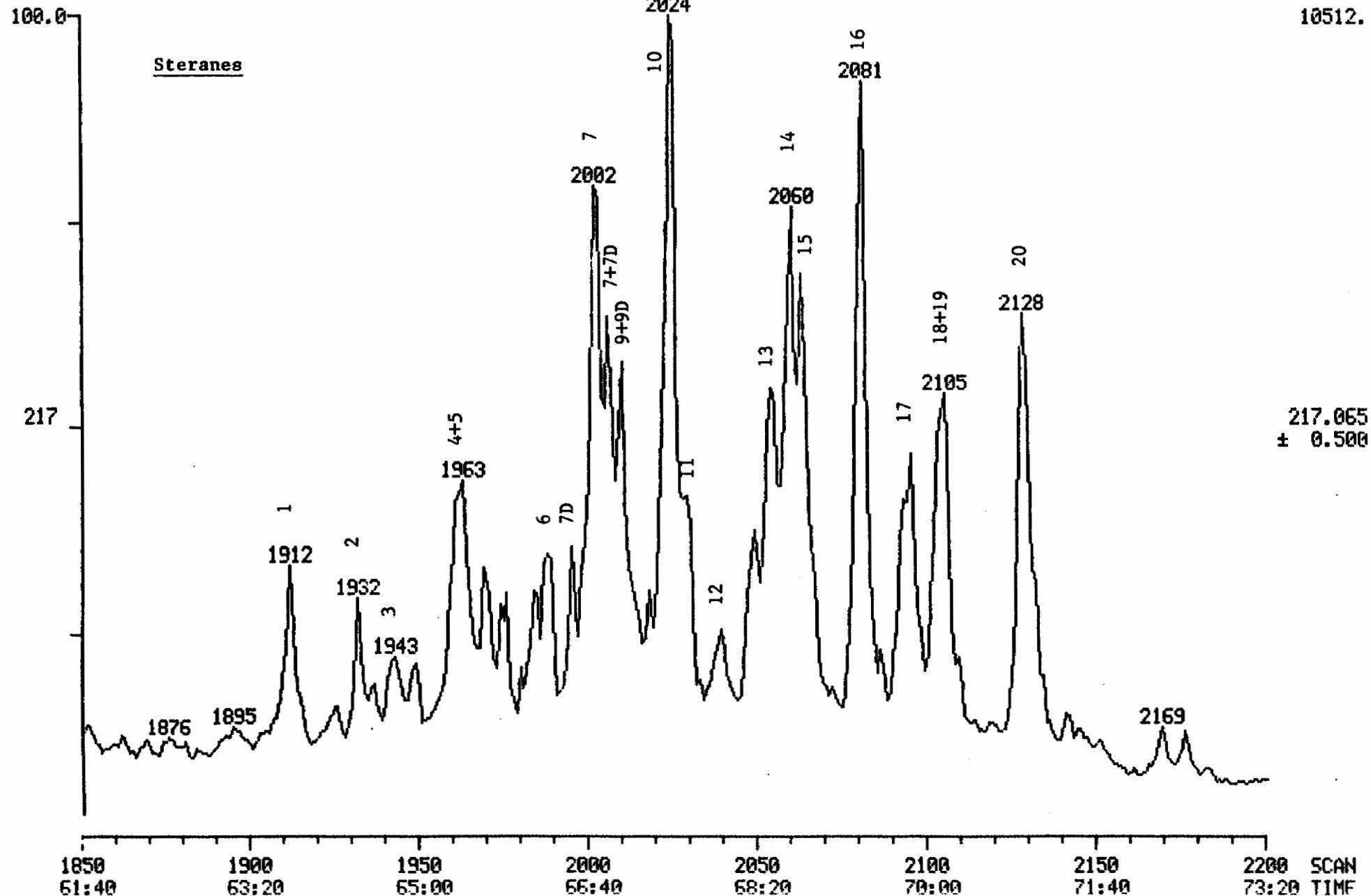
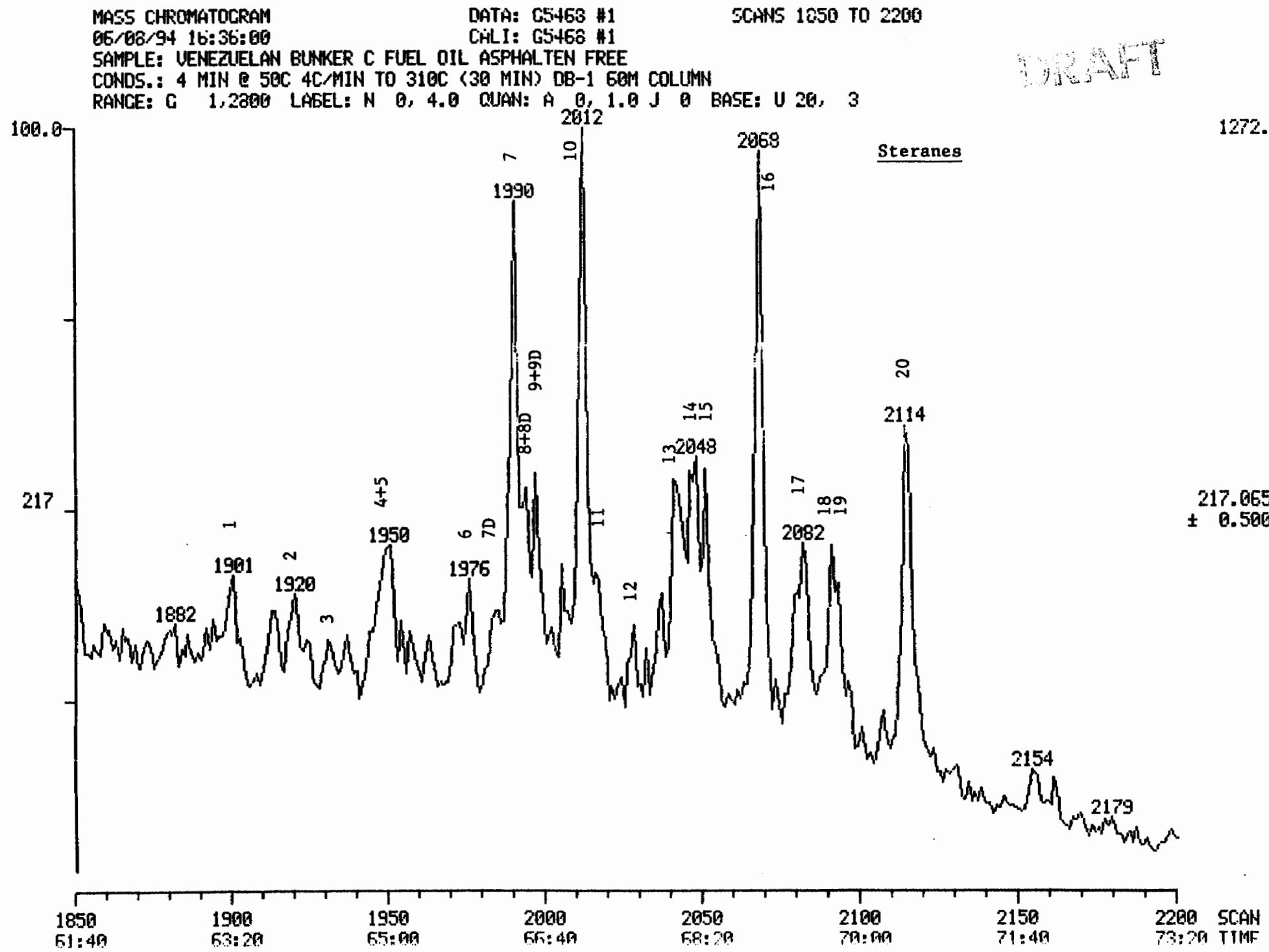


Figure 49: Mass chromatogram of steranes (m/z 217) obtained from Bunker C oil.



Aromatic Hydrocarbon Distribution

RS16 0.5–1.0'

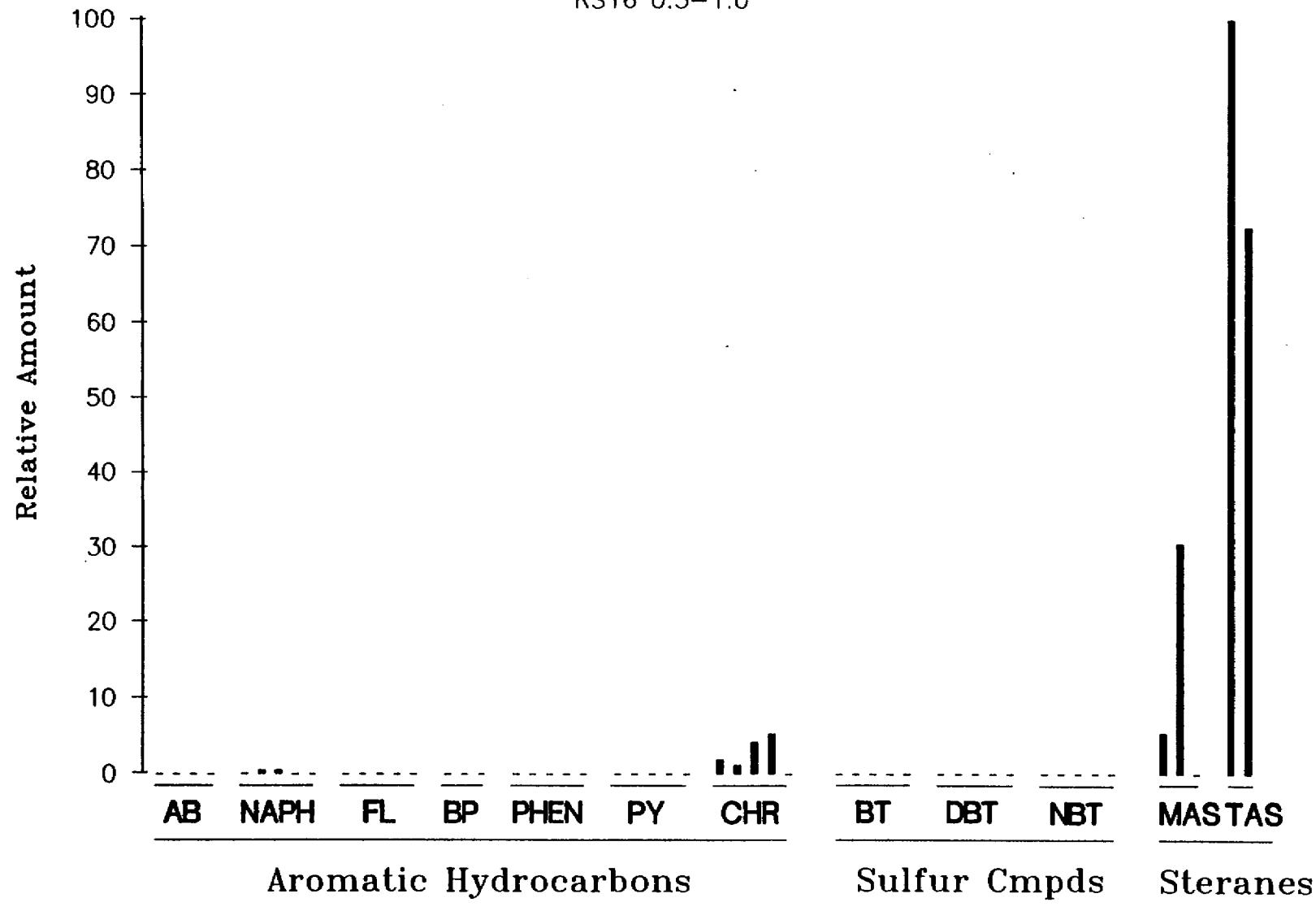


Figure 50: Aromatic hydrocarbon distribution pattern of sample RS16 (0.5–1').

DRAFT

Aromatic Hydrocarbon Distribution

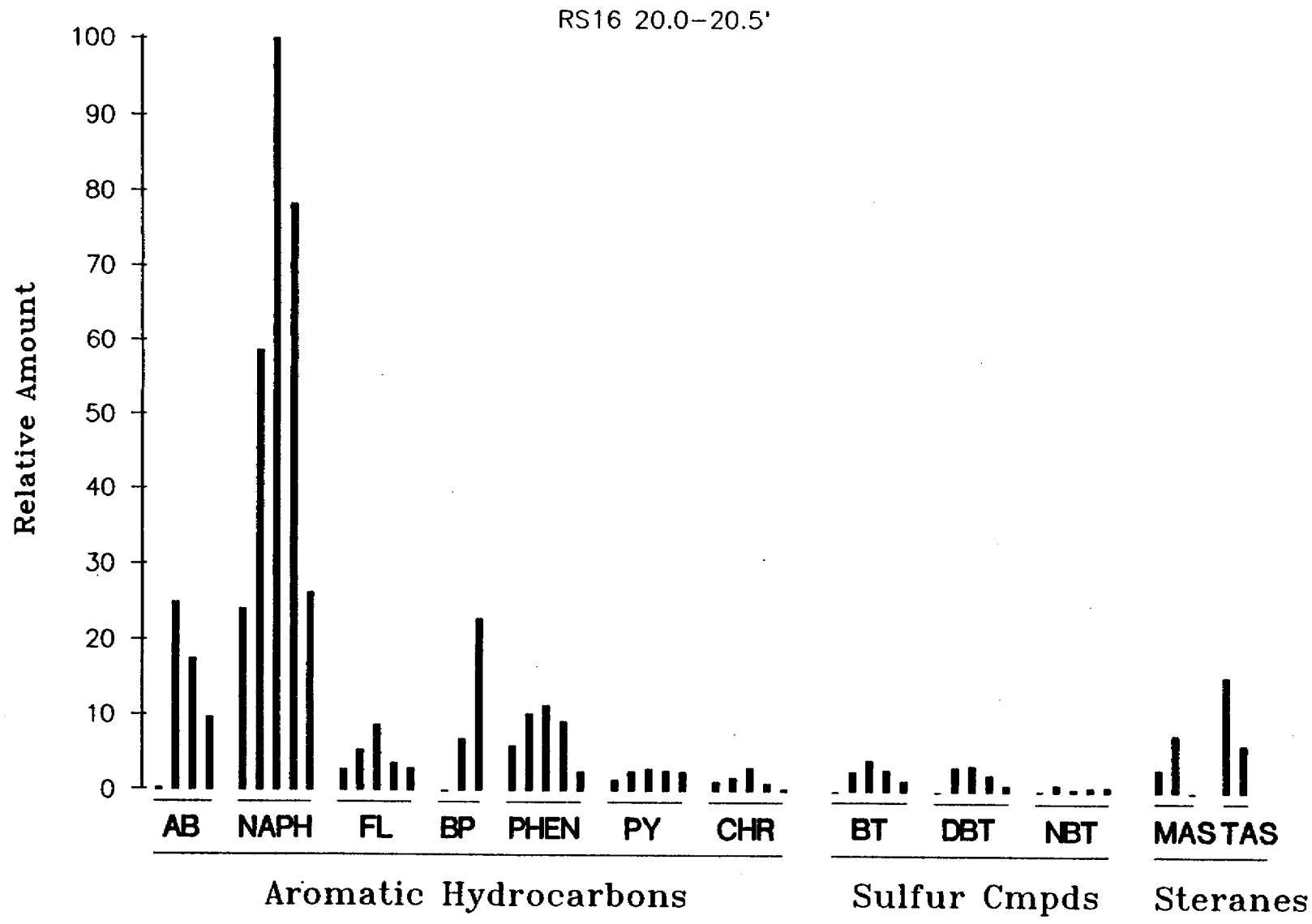


Figure 51: Aromatic hydrocarbon distribution pattern of sample RS16 (20-20.5').

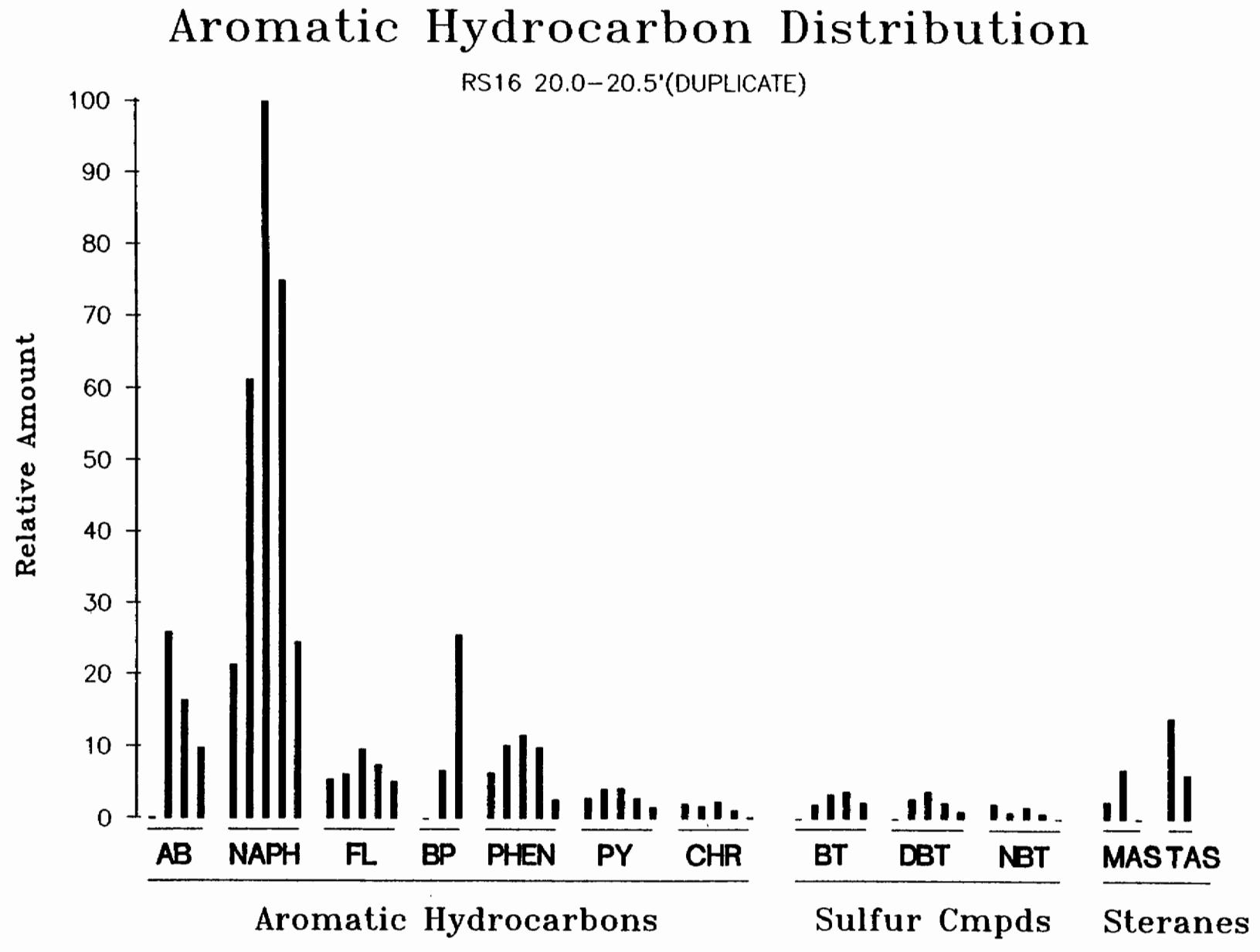


Figure 52: Aromatic hydrocarbon distribution pattern of sample RS16 (20-20.5') (duplicate).

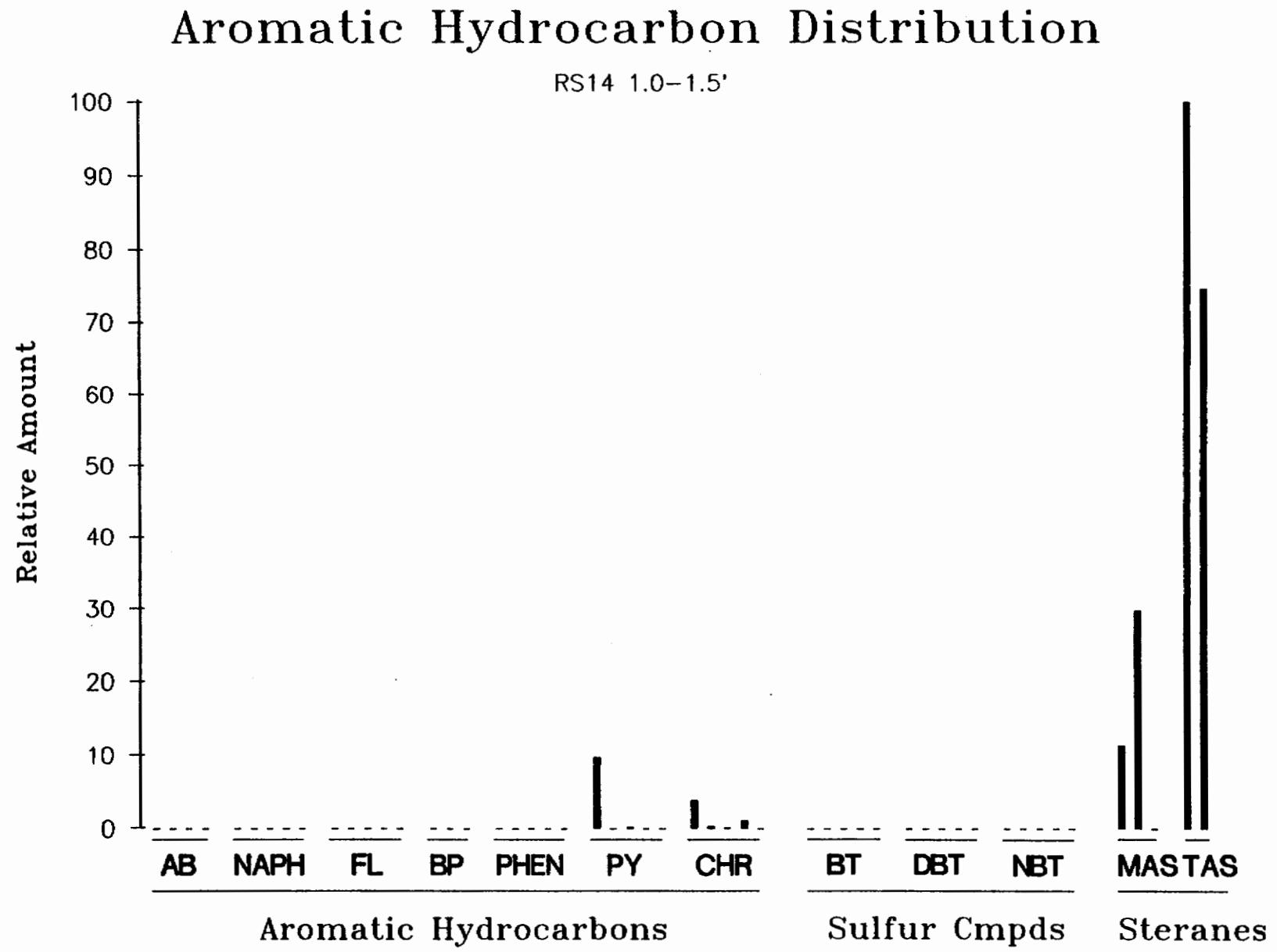


Figure 53: Aromatic hydrocarbon distribution pattern of sample RS14 (1-1.5').

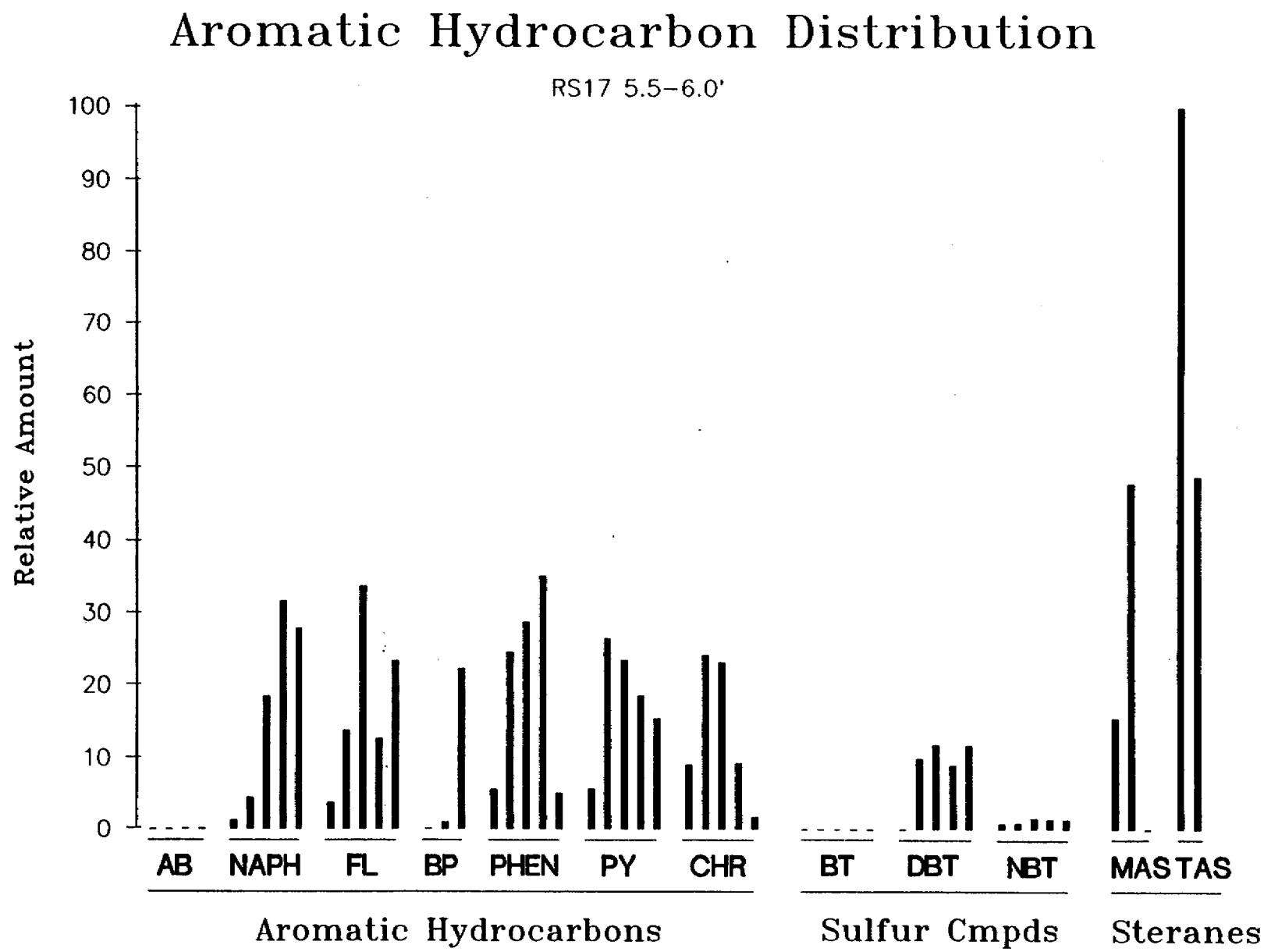


Figure 54: Aromatic hydrocarbon distribution pattern of sample RS17 (5.5-6').

Aromatic Hydrocarbon Distribution

RS15 15.5-16.0'

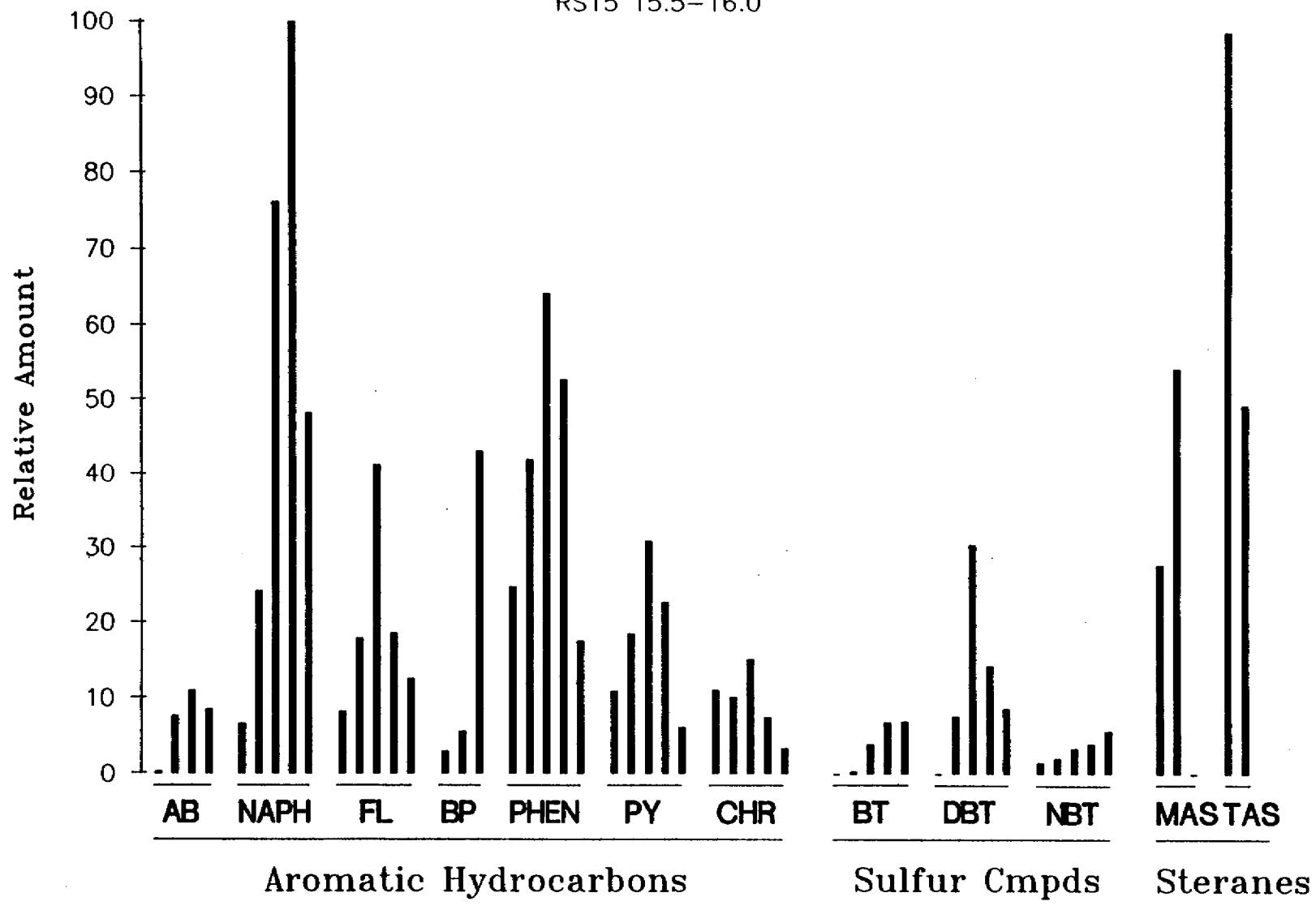


Figure 55: Aromatic hydrocarbon distribution pattern of sample RS15 (15.5-16').

Aromatic Hydrocarbon Distribution

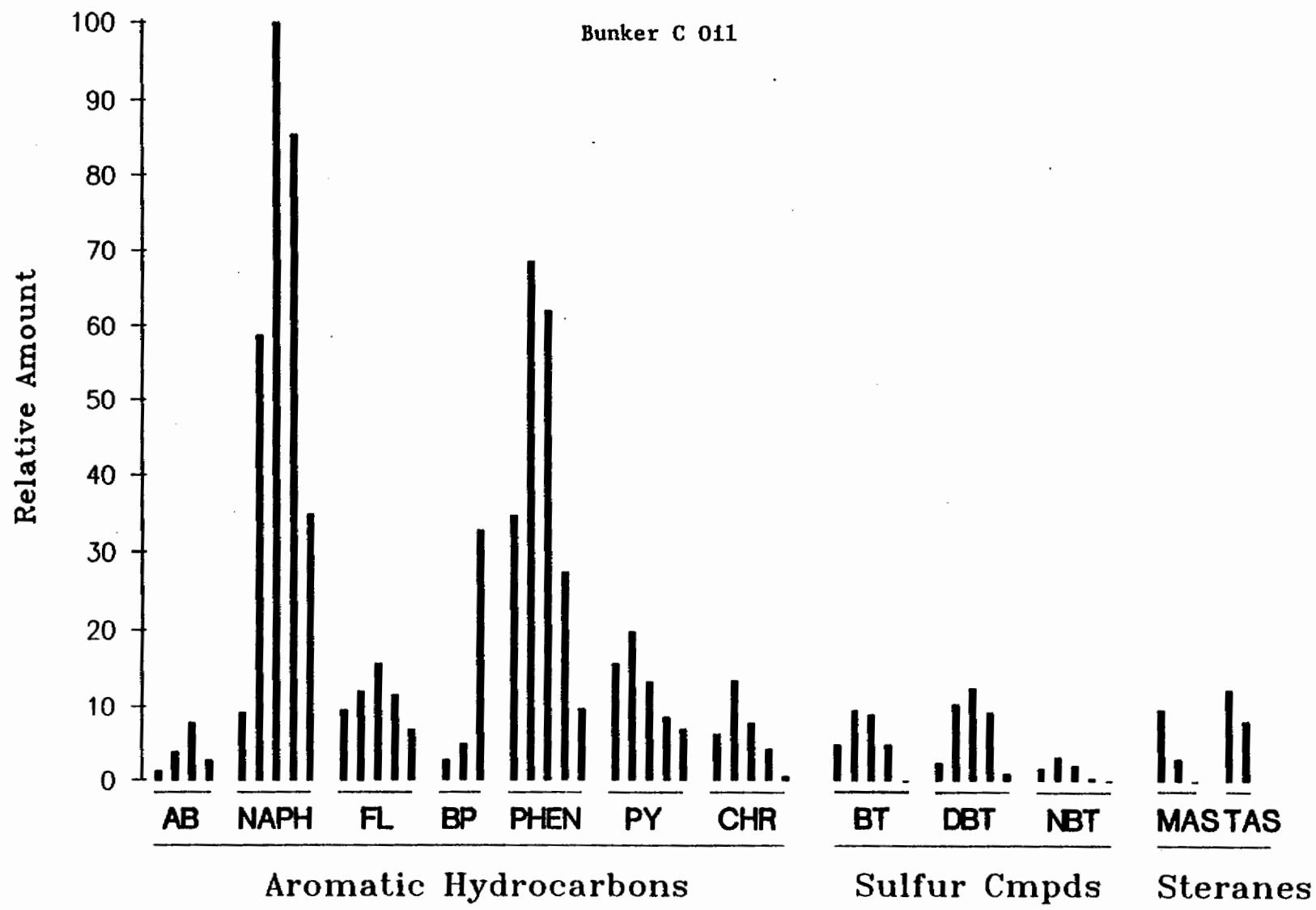


Figure 56: Aromatic hydrocarbon distribution pattern of Bunker C oil.

DRAFT

Appendix 1:

Copies of Chain-of-Custody



rding Lawson Associates
tton Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

DRAFT CHAIN OF CUSTODY FORM

Lab: Global

Job Number: 24246-2.3

Name/Location: Teraco Walker, Santa Fe Springs

Project Manager: Rachel Martinez Recorder: Rachel Martinez
(Signature Required)

Samplers: Karen Witbaard

ANALYSIS REQUESTED	
EPA 601/8010	✓
EPA 602/8020	✓
EPA 624/8240	✓
EPA 625/8270	✓
Priority Pltn. Metals	✓
Benzene/Toluene/Xylene	✓
Total Petrol. Hydrocarb.	✓
	✓ - C ₃
	✓ - C ₂ - C ₃ 5
	✓ - High Resolution g/mS

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
<i>Karen J. Veltman</i>		
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LABORATORY: DATE/TIME (Signature)
METHOD OF SHIPMENT		



Herding Lawson Associates
Julian Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

DRAFT CHAIN OF CUSTODY FORM

Lab: Globa

Job Number: 24246 - 2.3

Name/Location: Tekaco-Walker, Santa Fe Springs

Project Manager: Rachel Martinez Recorder: Rachel Martinez

Samplers: Karen Witbaard

STATION DESCRIPTION/
NOTES

A2462

-4

-5

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <i>Katherine G. Garrett</i>	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)
METHOD OF SHIPMENT	<i>5/24/98 Kamak R. Dwyer 10/19/98 CH LONG DT CR.</i>	
Project Office Copy Yellow	Field or Office Copy Black	65

DRAFT

Appendix 2:

Gas chromatography quantitation reports.

LABTECH CHROM V1.40

Analysis Start Date: JUNE 7, 1994 Time: 10:01:26.87

***** GGC Data Header *****
Global Geochemistry Corporation

BLANK

File: C15704

***** END GGC Header *****

PEAK AREAS:

index	time(min)	area	area(%)	baseline(V)	height(V)	
1	4.617	3.931	18.070	0.833	0.301	""
2	4.917	1.986	9.125	0.856	0.172	""
3	5.383	0.083	0.384	0.882	0.027	""
4	6.233	1.770	8.132	0.831	0.340	""
5	42.170	13.990	64.290	0.805	2.809	"IS"

Analysis Start Date: JUNE 7, 1994 Time: 10:01:38.62

***** GGC Data Header *****
Global Geochemistry Corporation
Std (C8-32)
File: C15705

***** END GGC Header *****

PEAK AREAS:

index	time(min)	area	area(%)	baseline(V)	height(V)	
1	4.483	15.330	2.754	0.688	0.698	" "
2	5.117	44.400	7.974	0.790	10.200	"8"
3	8.033	43.070	7.736	0.803	9.004	"9"
4	11.630	59.080	10.610	0.810	9.426	"10"
5	15.380	63.740	11.450	0.814	9.008	"11"
6	17.370	0.076	0.013	0.811	0.020	" "
7	17.880	0.295	0.053	0.812	0.075	" "
8	19.070	66.340	11.920	0.814	8.976	"12"
9	24.830	0.281	0.050	0.809	0.071	" "
10	25.930	80.330	14.430	0.815	9.489	"14"
11	30.570	0.074	0.013	0.808	0.018	" "
12	31.100	0.345	0.062	0.807	0.069	" "
13	32.120	80.720	14.500	0.810	8.779	"16"
14	36.750	0.247	0.044	0.811	0.071	" "
15	37.630	45.820	8.229	0.814	6.758	"18"
16	42.400	17.200	3.090	0.813	2.860	"IS"
17	42.630	17.430	3.131	0.816	3.101	"20"
18	51.480	12.160	2.184	0.826	2.167	"24"
19	59.050	5.574	1.001	0.863	1.250	"28"
20	67.070	4.240	0.761	0.896	0.542	"32"

LABTECH CHROM V1.40

Analysis Start Date: JUNE 7, 1994 Time: 10:00:13.27

***** GGC Data Header *****
Global Geochemistry Corporation
RS14 1-1.5
File: C15402

***** END GGC Header *****

PEAK AREAS:

index	time(min)	area	area(%)	baseline(V)	height(V)	
1	33.000	0.163	0.098	0.815	0.017	""
2	34.600	0.466	0.281	0.823	0.081	""
3	35.520	0.127	0.076	0.827	0.011	""
4	37.380	0.470	0.283	0.844	0.085	""
5	37.600	0.232	0.140	0.846	0.049	""
6	39.550	0.246	0.148	0.866	0.035	""
7	40.700	0.901	0.542	0.881	0.102	""
8	41.850	20.960	12.630	0.902	3.453	"IS"
9	42.080	0.092	0.055	0.903	0.022	""
10	44.670	0.075	0.045	0.944	0.020	""
11	44.780	0.251	0.151	0.945	0.021	""
12	45.430	0.686	0.413	0.949	0.063	""
13	46.570	0.314	0.189	0.969	0.023	""
14	47.270	0.315	0.190	0.975	0.028	""
15	47.630	0.579	0.349	0.982	0.040	""
16	48.300	0.173	0.104	0.999	0.029	""
17	49.780	0.930	0.560	1.030	0.060	""
18	50.370	0.549	0.331	1.044	0.033	""
19	50.950	0.108	0.065	1.062	0.023	""
20	51.520	0.213	0.128	1.064	0.035	""
21	51.670	0.153	0.092	1.063	0.045	""
22	51.900	0.256	0.154	1.067	0.033	""
23	52.320	1.412	0.850	1.077	0.044	""
24	52.980	0.407	0.245	1.094	0.041	""
25	53.170	0.264	0.159	1.098	0.040	""
26	53.380	0.496	0.298	1.104	0.032	""
27	54.170	1.312	0.790	1.128	0.048	""
28	54.780	0.065	0.039	1.152	0.018	""
29	55.550	0.639	0.385	1.160	0.058	""
30	55.680	0.234	0.141	1.159	0.041	""
31	55.820	0.727	0.438	1.158	0.075	""
32	56.200	1.714	1.033	1.156	0.098	""
33	56.870	3.506	2.113	1.153	0.110	""
34	57.470	3.349	2.018	1.149	0.161	""
35	57.930	5.432	3.273	1.147	0.218	""
36	58.400	3.972	2.393	1.144	0.197	""
37	58.600	2.095	1.262	1.143	0.257	""
38	58.720	1.536	0.925	1.142	0.227	""
39	58.830	3.955	2.383	1.142	0.212	""

40	59.420	7.067	4.258	1.138	0.273	""
41	59.680	1.686	1.016	1.137	0.254	""
42	59.800	1.834	1.105	1.136	0.237	""
43	60.150	5.276	3.180	1.134	0.278	""
44	60.520	6.694	4.034	1.132	0.392	""
45	60.670	5.591	3.369	1.131	0.288	""
46	61.000	3.603	2.171	1.130	0.323	""
47	61.570	7.682	4.629	1.126	0.319	""
48	61.700	2.754	1.660	1.126	0.303	""
49	61.920	10.480	6.314	1.124	0.320	""
50	62.600	5.310	3.200	1.121	0.284	""
51	62.970	6.015	3.625	1.119	0.200	""
52	63.500	5.094	3.070	1.116	0.210	""
53	64.030	1.627	0.980	1.113	0.193	""
54	64.150	1.115	0.671	1.112	0.191	""
55	64.320	3.753	2.262	1.111	0.244	""
56	64.650	2.985	1.799	1.109	0.151	""
57	65.330	3.625	2.184	1.105	0.147	""
58	65.750	0.779	0.469	1.103	0.110	""
59	65.930	1.112	0.670	1.102	0.131	""
60	66.170	2.400	1.446	1.101	0.125	""
61	66.630	1.143	0.688	1.098	0.112	""
62	66.920	1.021	0.615	1.097	0.107	""
63	67.180	0.535	0.322	1.095	0.074	""
64	67.480	0.863	0.520	1.093	0.085	""
65	67.680	0.224	0.135	1.092	0.055	""
66	67.780	0.752	0.453	1.092	0.072	""
67	68.180	0.271	0.163	1.094	0.056	""
68	69.120	1.184	0.713	1.080	0.082	""
69	69.350	0.251	0.151	1.069	0.057	""
70	69.480	0.356	0.214	1.063	0.064	""
71	69.720	0.609	0.367	1.054	0.046	""
72	70.130	0.583	0.351	1.049	0.055	""
73	70.520	0.263	0.158	1.045	0.055	""
74	70.630	0.456	0.275	1.043	0.077	""
75	70.870	0.577	0.348	1.040	0.060	""
76	72.380	1.074	0.647	1.012	0.070	""
77	72.580	1.201	0.723	1.008	0.092	""
78	72.870	0.274	0.165	1.002	0.043	""
79	73.020	0.271	0.163	0.999	0.070	""
80	73.280	0.911	0.549	0.993	0.067	""
81	73.530	0.455	0.274	0.988	0.061	""
82	73.830	0.863	0.520	0.984	0.055	""
83	74.170	0.802	0.483	0.982	0.055	""
84	74.470	0.597	0.359	0.980	0.055	""
85	74.770	0.291	0.175	0.979	0.056	""
86	74.950	0.335	0.202	0.978	0.068	""
87	75.070	0.380	0.229	0.977	0.052	""
88	75.280	0.402	0.242	0.976	0.078	""
89	75.400	0.955	0.575	0.976	0.051	""
90	76.020	0.137	0.083	0.973	0.036	""
91	76.230	0.340	0.205	0.973	0.050	
92	76.550	0.651	0.392	0.973	0.052	
93	76.770	0.756	0.456	0.974	0.049	
94	77.050	0.285	0.172	0.974	0.034	

DRAFT

Analysis Start Date: JUNE 7, 1994 Time: 09:59:59.54

***** GGC Data Header *****
 Global Geochemistry Corporation
 RS16 0.5-1
 File: C15401

***** END GGC Header *****

PEAK AREAS:

index	time(min)	area	area(%)	baseline(V)	height(V)	
1	34.880	0.217	0.121	0.811	0.037	""
2	37.670	0.184	0.102	0.832	0.043	""
3	37.900	0.243	0.135	0.826	0.043	""
4	39.830	0.057	0.032	0.847	0.016	""
5	40.950	0.684	0.381	0.855	0.075	""
6	42.170	17.680	9.847	0.870	2.714	"IS"
7	44.330	0.155	0.086	0.888	0.018	""
8	44.950	0.278	0.155	0.895	0.015	""
9	45.700	0.616	0.343	0.906	0.050	""
10	45.950	0.065	0.036	0.910	0.016	""
11	46.920	0.615	0.342	0.921	0.031	""
12	48.400	0.158	0.088	0.938	0.025	""
13	48.500	0.092	0.051	0.941	0.023	""
14	48.920	0.414	0.230	0.957	0.038	""
15	49.430	0.223	0.124	0.988	0.023	""
16	49.920	0.382	0.212	0.969	0.030	""
17	51.080	0.443	0.246	0.996	0.022	""
18	51.670	0.193	0.107	0.998	0.036	""
19	52.350	0.285	0.159	1.011	0.043	""
20	52.450	0.155	0.086	1.010	0.039	""
21	53.300	1.752	0.975	1.040	0.049	""
22	54.170	0.443	0.246	1.073	0.027	""
23	54.420	0.287	0.159	1.083	0.039	""
24	55.180	0.463	0.258	1.091	0.056	""
25	55.450	0.225	0.125	1.084	0.053	""
26	55.550	0.196	0.109	1.085	0.052	""
27	55.880	1.007	0.560	1.101	0.067	""
28	56.420	0.977	0.544	1.127	0.055	""
29	56.920	1.815	1.011	1.140	0.079	""
30	57.450	0.793	0.442	1.136	0.136	""
31	57.580	1.252	0.697	1.135	0.166	""
32	58.050	2.927	1.631	1.131	0.156	""
33	58.320	2.012	1.121	1.129	0.186	""
34	58.430	0.824	0.459	1.128	0.134	""
35	58.750	2.800	1.559	1.125	0.197	""
36	58.880	5.335	2.971	1.124	0.247	""
37	59.680	8.571	4.774	1.117	0.280	""
38	60.000	3.065	1.707	1.115	0.251	""
39	60.470	6.438	3.586	1.111	0.278	""
40	60.700	2.502	1.393	1.109	0.340	""

41	61.050	7.146	3.980	1.106	0.332	" "
42	61.330	6.019	3.352	1.104	0.335	" "
43	61.700	4.693	2.614	1.101	0.298	" "
44	61.900	3.556	1.980	1.099	0.367	" "
45	62.050	2.831	1.577	1.098	0.318	" "
46	62.250	8.301	4.623	1.096	0.342	" "
47	62.880	9.662	5.381	1.091	0.296	" "
48	63.380	1.719	0.957	1.087	0.218	" "
49	63.520	2.146	1.195	1.085	0.201	" "
50	63.700	2.091	1.165	1.084	0.214	" "
51	64.050	6.766	3.768	1.081	0.226	" "
52	64.500	3.170	1.765	1.077	0.223	" "
53	64.720	2.445	1.362	1.075	0.311	" "
54	64.980	2.921	1.627	1.073	0.223	" "
55	65.170	1.626	0.905	1.072	0.166	" "
56	65.430	3.800	2.117	1.069	0.177	" "
57	65.850	3.301	1.838	1.066	0.169	" "
58	66.330	2.813	1.567	1.062	0.147	" "
59	66.620	1.437	0.800	1.060	0.156	" "
60	66.850	3.729	2.077	1.058	0.155	" "
61	67.450	2.498	1.391	1.053	0.144	" "
62	68.030	2.305	1.284	1.048	0.111	" "
63	68.270	1.121	0.624	1.046	0.103	" "
64	68.480	1.363	0.759	1.044	0.113	" "
65	68.750	0.704	0.392	1.042	0.099	" "
66	68.930	1.510	0.841	1.040	0.140	" "
67	69.270	1.483	0.826	1.038	0.107	" "
68	69.500	1.194	0.665	1.036	0.122	" "
69	70.230	2.780	1.548	1.030	0.068	" "
70	70.620	0.817	0.455	1.026	0.060	" "
71	70.720	0.547	0.304	1.026	0.083	" "
72	70.880	0.916	0.510	1.024	0.096	" "
73	71.150	0.681	0.379	1.022	0.073	" "
74	71.380	0.898	0.500	1.020	0.068	" "
75	71.670	1.900	1.058	1.018	0.080	" "
76	72.250	0.342	0.190	1.013	0.058	" "
77	72.380	0.617	0.344	1.012	0.085	" "
78	72.550	0.408	0.227	1.010	0.048	" "
79	72.730	0.445	0.248	1.009	0.067	" "
80	72.880	0.364	0.203	1.007	0.096	" "
81	73.170	1.763	0.982	1.003	0.105	" "
82	73.700	0.299	0.166	0.993	0.065	" "
83	73.820	0.447	0.249	0.992	0.072	" "
84	74.080	0.976	0.543	0.990	0.050	" "
85	74.420	0.308	0.171	0.987	0.068	" "
86	74.530	0.274	0.153	0.985	0.057	" "
87	74.630	0.247	0.137	0.985	0.054	" "
88	74.850	0.928	0.517	0.983	0.058	" "
89	75.170	0.342	0.191	0.980	0.058	" "
90	75.280	0.545	0.303	0.979	0.070	" "
91	75.500	0.180	0.100	0.976	0.040	" "
92	75.720	0.875	0.487	0.974	0.059	" "
93	76.050	0.307	0.171	0.972	0.071	" "
94	76.230	0.539	0.300	0.971	0.072	
95	76.380	0.277	0.154	0.970	0.059	
96	76.500	0.675	0.376	0.970	0.051	
97	77.070	0.502	0.279	0.976	0.038	
98	77.220	0.147	0.082	0.980	0.033	

DRAFT

Analysis Start Date: JUNE 20, 1994 Time: 08:52:04.39

***** GGC Data Header *****
 Global Geochemistry Corporation
 RS16 20-20.5
 File: C16703

***** END GGC Header *****

PEAK AREAS:

index	time(min)	area	area(%)	baseline(V)	height(V)	
1	5.083	3.019	0.223	0.824	0.220	""
2	5.667	0.147	0.010	0.908	0.037	""
3	5.917	1.777	0.131	0.895	0.140	""
4	6.333	1.759	0.130	0.877	0.348	""
5	6.700	0.492	0.036	0.871	0.052	""
6	6.900	0.841	0.062	0.868	0.123	""
7	7.167	0.577	0.042	0.867	0.117	""
8	7.350	0.923	0.068	0.867	0.214	""
9	7.450	1.445	0.107	0.866	0.289	""
10	7.967	2.664	0.197	0.864	0.344	""
11	8.283	2.523	0.186	0.865	0.400	""
12	8.483	1.147	0.084	0.868	0.157	""
13	8.750	2.897	0.214	0.872	0.512	""
14	8.967	1.259	0.093	0.875	0.184	""
15	9.167	2.353	0.174	0.878	0.313	""
16	9.283	1.449	0.107	0.880	0.247	""
17	9.400	2.172	0.160	0.881	0.213	""
18	9.650	4.780	0.354	0.885	1.033	""
19	9.817	2.346	0.173	0.887	0.252	""
20	10.030	1.187	0.087	0.890	0.263	""
21	10.170	1.630	0.120	0.892	0.292	""
22	10.400	4.680	0.346	0.895	0.441	""
23	10.780	5.663	0.419	0.901	0.438	""
24	10.920	1.734	0.128	0.903	0.267	""
25	11.150	2.004	0.148	0.906	0.352	""
26	11.320	4.546	0.336	0.909	0.331	""
27	11.570	0.877	0.064	0.912	0.162	""
28	11.680	1.910	0.141	0.914	0.305	""
29	12.130	6.161	0.456	0.920	0.561	""
30	12.450	3.150	0.233	0.925	0.354	""
31	12.550	3.047	0.225	0.926	0.304	""
32	12.870	6.777	0.502	0.931	0.659	""
33	13.080	6.685	0.495	0.934	0.916	""
34	13.320	2.009	0.148	0.937	0.260	""
35	13.430	1.242	0.092	0.939	0.218	""
36	13.700	4.482	0.332	0.942	0.359	""
37	14.000	8.104	0.600	0.947	0.662	""
38	14.170	2.442	0.180	0.949	0.328	""
39	14.450	8.938	0.662	0.953	0.409	""
40	14.820	5.573	0.412	0.958	0.389	""

41	15.250	9.271	0.686	0.964	1.178	""
42	15.420	3.108	0.230	0.967	0.270	""
43	15.820	12.980	0.961	0.973	1.245	""
44	16.300	7.672	0.568	0.979	0.582	""
45	16.420	4.440	0.329	0.981	0.755	""
46	16.670	5.468	0.405	0.985	0.397	""
47	16.920	3.134	0.232	0.988	0.385	""
48	17.200	5.727	0.424	0.992	0.474	""
49	17.300	5.265	0.390	0.994	0.464	""
50	17.550	3.425	0.253	0.997	0.414	""
51	17.770	7.039	0.521	1.001	0.734	""
52	17.870	6.087	0.450	1.002	0.754	""
53	18.050	3.630	0.268	1.005	0.552	""
54	18.180	7.608	0.563	1.007	0.565	""
55	18.470	5.269	0.390	1.011	0.575	""
56	18.720	8.268	0.612	1.014	0.478	""
57	18.980	3.334	0.247	1.018	0.363	""
58	19.170	5.401	0.400	1.021	0.356	""
59	19.530	21.370	1.583	1.026	2.373	"i13"
60	19.800	5.062	0.375	1.030	0.507	""
61	20.020	9.948	0.737	1.033	0.581	""
62	20.380	8.056	0.596	1.038	0.761	""
63	20.720	6.166	0.456	1.043	0.588	""
64	20.870	12.490	0.925	1.045	0.834	""
65	21.230	12.720	0.942	1.050	1.236	""
66	21.670	43.010	3.186	1.056	4.625	"i14"
67	21.970	5.542	0.410	1.060	0.602	""
68	22.300	10.670	0.790	1.065	0.548	""
69	22.670	4.783	0.354	1.070	0.412	""
70	22.930	7.383	0.547	1.074	0.530	""
71	23.130	10.600	0.785	1.077	1.019	""
72	23.280	2.767	0.205	1.079	0.426	""
73	23.470	4.487	0.332	1.082	0.526	""
74	23.670	4.936	0.365	1.085	0.502	""
75	23.900	5.931	0.439	1.088	0.384	""
76	24.230	3.285	0.243	1.093	0.366	""
77	24.330	3.588	0.265	1.094	0.363	""
78	24.620	7.697	0.570	1.098	0.469	""
79	24.820	2.983	0.221	1.101	0.436	""
80	25.180	34.310	2.541	1.106	3.670	"i15"
81	25.480	9.003	0.666	1.110	1.242	""
82	25.580	9.502	0.704	1.112	0.918	""
83	26.020	11.970	0.886	1.118	0.855	""
84	26.320	2.067	0.153	1.122	0.331	""
85	26.500	5.580	0.413	1.125	0.407	""
86	26.700	2.964	0.219	1.128	0.318	""
87	26.830	4.883	0.361	1.130	0.349	""
88	27.170	5.309	0.393	1.134	0.477	""
89	27.450	5.846	0.433	1.138	0.368	""
90	27.920	22.230	1.647	1.145	3.080	"i16"
91	28.130	4.173	0.309	1.148	0.449	""
92	28.250	2.851	0.211	1.150	0.447	""
93	28.470	6.009	0.445	1.153	0.452	""
94	28.900	8.423	0.624	1.159	0.515	""
95	29.070	3.902	0.289	1.161	0.515	""
96	29.250	2.383	0.176	1.164	0.259	""
97	29.520	3.591	0.266	1.168	0.401	""
98	29.630	2.309	0.171	1.169	0.301	""
99	30.000	4.774	0.353	1.175	0.357	""
100	30.400	6.034	0.447	1.180	0.396	""

101	30.750	6.493	0.481	1.185	0.671	" "
102	31.050	5.179	0.383	1.190	0.533	" "
103	31.280	1.194	0.088	1.193	0.117	" "
104	31.620	1.583	0.117	1.198	0.169	" "
105	31.800	3.502	0.259	1.200	0.458	" "
106	31.930	3.418	0.253	1.202	0.204	" "
107	32.280	1.829	0.135	1.207	0.162	" "
108	32.620	1.098	0.081	1.212	0.111	" "
109	32.800	0.688	0.051	1.214	0.083	" "
110	33.200	1.090	0.080	1.237	0.076	" "
111	33.530	16.100	1.193	1.265	1.826	"i18"
112	34.000	2.158	0.159	1.275	0.272	" "
113	34.180	0.609	0.045	1.260	0.139	" "
114	34.420	1.360	0.100	1.254	0.082	" "
115	35.150	24.950	1.848	1.235	2.720	"PR"
116	35.280	0.996	0.073	1.232	0.163	" "
117	35.680	3.754	0.278	1.227	0.225	" "
118	36.150	2.139	0.158	1.226	0.203	" "
119	36.350	3.178	0.235	1.226	0.374	" "
120	36.920	3.104	0.230	1.224	0.139	" "
121	37.320	2.699	0.199	1.223	0.142	" "
122	37.530	0.952	0.070	1.222	0.162	" "
123	37.920	16.750	1.241	1.221	1.905	"PH"
124	38.300	0.946	0.070	1.220	0.102	" "
125	38.580	4.485	0.332	1.220	0.342	" "
126	38.930	0.957	0.070	1.219	0.184	" "
127	39.050	1.288	0.095	1.219	0.152	" "
128	39.250	3.167	0.234	1.218	0.146	" "
129	39.670	2.112	0.156	1.217	0.142	" "
130	40.030	7.359	0.545	1.216	0.726	" "
131	40.470	1.306	0.096	1.215	0.166	" "
132	40.570	1.781	0.132	1.215	0.233	" "
133	40.900	2.407	0.178	1.214	0.171	" "
134	41.170	2.184	0.161	1.213	0.170	" "
135	41.550	1.318	0.097	1.212	0.116	" "
136	41.670	1.524	0.112	1.212	0.117	" "
137	41.950	1.610	0.119	1.211	0.155	" "
138	42.420	21.060	1.560	1.210	2.681	"IS"
139	42.620	3.092	0.229	1.209	0.345	" "
140	43.150	4.253	0.315	1.208	0.170	" "
141	43.670	3.507	0.259	1.207	0.192	" "
142	43.980	2.223	0.164	1.206	0.172	" "
143	44.180	1.566	0.116	1.205	0.165	" "
144	44.520	5.589	0.414	1.204	0.585	" "
145	44.730	1.815	0.134	1.204	0.159	" "
146	45.130	4.000	0.296	1.203	0.260	" "
147	45.300	1.607	0.119	1.202	0.179	" "
148	45.520	2.426	0.179	1.202	0.192	" "
149	45.820	7.466	0.553	1.201	0.418	" "
150	46.350	1.878	0.139	1.200	0.172	" "
151	46.550	2.880	0.213	1.199	0.224	" "
152	46.880	3.744	0.277	1.198	0.294	" "
153	47.150	3.296	0.244	1.198	0.237	" "
154	47.330	1.253	0.092	1.197	0.198	" "
155	47.430	1.383	0.102	1.197	0.248	" "
156	47.530	1.430	0.105	1.197	0.194	" "
157	48.130	9.374	0.694	1.195	0.495	" "
158	48.350	2.308	0.171	1.194	0.231	" "
159	48.730	4.673	0.346	1.193	0.294	" "
160	48.970	3.060	0.226	1.193	0.245	" "

Height Sample	Pr/17	Ph/18	Pr/Ph	CPI	Odd
C15703.CHL P-5 20-20.5	0.00	0.00	1.43	0.00	0.0

DRAFT

LABTECH CHROM V1.40

Analysis Start Date: JUNE 7, 1994 Time: 10:01:06.82

***** GGC Data Header *****
Global Geochemistry Corporation
RS16 20-20.5 (Duplicate)
File: C15703

***** END GGC Header *****

PEAK AREAS:

index	time(min)	area	area(%)	baseline(V)	height(V)	
1	4.850	7.883	0.233	0.062	0.911	" "
2	5.600	7.272	0.215	0.072	0.850	" "
3	5.700	8.930	0.264	0.073	0.863	" "
4	5.883	8.668	0.256	0.076	0.811	" "
5	6.133	15.380	0.455	0.079	0.982	" "
6	6.500	15.770	0.467	0.084	0.769	" "
7	6.700	13.700	0.405	0.087	0.817	" "
8	6.967	9.115	0.269	0.091	0.807	" "
9	7.167	19.620	0.580	0.093	0.860	" "
10	7.783	23.280	0.689	0.102	0.956	" "
11	8.117	13.950	0.413	0.106	1.026	" "
12	8.300	9.381	0.277	0.109	0.837	" "
13	8.567	15.730	0.465	0.113	1.134	" "
14	8.983	16.820	0.498	0.118	0.959	" "
15	9.117	18.300	0.541	0.120	0.890	" "
16	9.467	11.580	0.342	0.125	1.763	" "
17	9.617	11.760	0.348	0.127	0.890	" "
18	9.850	7.289	0.215	0.130	0.955	" "
19	10.000	8.576	0.253	0.132	0.946	" "
20	10.230	13.880	0.411	0.135	1.026	" "
21	10.620	21.550	0.638	0.141	1.083	" "
22	10.750	10.540	0.312	0.142	0.902	" "
23	10.980	10.080	0.298	0.146	1.001	" "
24	11.180	17.020	0.504	0.148	0.954	" "
25	11.420	5.606	0.166	0.152	0.850	" "
26	11.530	12.080	0.357	0.153	0.989	" "
27	11.980	25.400	0.751	0.159	1.171	" "
28	12.300	10.860	0.321	0.164	1.064	" "
29	12.450	10.840	0.321	0.166	0.955	" "
30	12.600	6.950	0.205	0.168	0.935	" "
31	12.720	14.420	0.427	0.169	1.304	" "
32	12.950	15.000	0.444	0.173	1.484	" "
33	13.180	9.415	0.278	0.176	0.949	" "
34	13.300	6.606	0.195	0.177	0.880	" "
35	13.550	17.610	0.521	0.181	1.025	" "
36	13.870	19.890	0.588	0.185	1.284	" "
37	14.050	8.289	0.245	0.188	0.994	" "
38	14.330	15.610	0.462	0.191	1.094	" "
39	14.480	13.560	0.401	0.194	1.059	" "

40	14.680	22.870	0.677	0.196	1.023	" "
41	15.120	16.470	0.487	0.202	1.808	" "
42	15.280	14.590	0.432	0.205	0.943	" "
43	15.530	6.018	0.178	0.208	0.875	" "
44	15.680	25.650	0.759	0.210	1.839	" "
45	16.070	10.600	0.313	0.215	1.022	" "
46	16.300	24.560	0.727	0.218	1.367	" "
47	16.530	12.660	0.374	0.222	1.028	" "
48	16.780	10.960	0.324	0.225	1.031	" "
49	17.050	14.960	0.443	0.229	1.151	" "
50	17.230	14.180	0.419	0.231	1.092	" "
51	17.420	9.613	0.284	0.234	1.104	" "
52	17.620	14.850	0.439	0.236	1.328	" "
53	17.750	12.770	0.378	0.238	1.351	" "
54	17.920	8.646	0.256	0.241	1.230	" "
55	18.050	18.760	0.555	0.242	1.183	" "
56	18.350	13.100	0.387	0.247	1.205	" "
57	18.480	7.437	0.220	0.248	1.082	" "
58	18.580	14.690	0.435	0.250	1.116	" "
59	18.850	12.000	0.355	0.253	1.026	" "
60	19.030	8.494	0.251	0.256	1.015	" "
61	19.150	8.624	0.255	0.257	0.984	" "
62	19.400	33.080	0.979	0.261	2.821	"i13"
63	19.670	12.700	0.375	0.265	1.228	" "
64	19.880	23.650	0.700	0.268	1.221	" "
65	20.230	19.200	0.568	0.272	1.395	" "
66	20.450	6.882	0.203	0.275	1.093	" "
67	20.570	10.750	0.318	0.277	1.249	" "
68	20.730	25.010	0.740	0.279	1.489	" "
69	21.080	23.270	0.688	0.284	1.964	" "
70	21.530	56.510	1.673	0.290	4.840	"i14"
71	21.830	22.560	0.668	0.294	1.241	" "
72	22.170	18.500	0.547	0.299	1.206	" "
73	22.480	12.900	0.382	0.303	1.105	" "
74	22.770	18.130	0.536	0.307	1.184	" "
75	23.000	19.510	0.577	0.310	1.681	" "
76	23.120	10.470	0.309	0.312	1.063	" "
77	23.320	13.040	0.386	0.315	1.262	" "
78	23.520	13.140	0.389	0.317	1.128	" "
79	23.720	20.730	0.613	0.320	1.056	" "
80	24.070	8.682	0.257	0.325	1.050	" "
81	24.180	10.720	0.317	0.326	1.023	" "
82	24.450	21.210	0.627	0.330	1.181	" "
83	24.650	10.360	0.306	0.333	1.100	" "
84	25.020	49.110	1.454	0.338	3.904	"i15"
85	25.300	14.100	0.417	0.342	1.841	" "
86	25.400	22.610	0.669	0.343	1.575	" "
87	25.870	36.080	1.068	0.349	1.561	" "
88	26.320	16.870	0.499	0.356	1.091	" "
89	26.530	8.584	0.254	0.359	0.994	" "
90	26.670	15.770	0.467	0.360	1.035	" "
91	26.980	16.890	0.500	0.365	1.160	" "
92	27.270	12.530	0.370	0.369	1.040	" "
93	27.400	7.555	0.223	0.370	1.004	" "
94	27.570	9.789	0.289	0.373	1.034	" "
95	27.770	27.420	0.811	0.376	3.665	"i16"
96	27.970	18.070	0.534	0.378	1.148	" "
97	28.180	7.858	0.232	0.381	1.042	" "
98	28.300	13.640	0.403	0.383	1.140	" "
99	28.550	11.610	0.343	0.386	1.090	" "

100	28.720	12.200	0.361	0.389	1.131	" "
101	28.870	11.710	0.346	0.391	1.188	" "
102	29.120	10.370	0.306	0.394	0.924	" "
103	29.300	11.170	0.330	0.397	1.081	" "
104	29.420	8.018	0.237	0.398	0.965	" "
105	29.820	23.410	0.693	0.404	1.028	" "
106	30.070	10.000	0.296	0.407	0.851	" "
107	30.220	14.660	0.434	0.409	1.064	" "
108	30.570	21.540	0.637	0.414	1.412	" "
109	30.880	29.630	0.877	0.418	1.230	" "
110	31.420	12.720	0.376	0.426	0.860	" "
111	31.620	27.660	0.819	0.428	1.125	" "
112	32.120	14.010	0.414	0.435	0.859	" "
113	32.400	11.900	0.352	0.439	0.801	" "
114	32.650	8.079	0.239	0.442	0.778	" "
115	33.020	15.430	0.457	0.447	0.808	" "
116	33.330	44.380	1.314	0.452	2.592	" i18"
117	33.800	10.860	0.321	0.458	0.932	" "
118	34.020	9.157	0.271	0.461	0.807	" "
119	34.350	16.240	0.480	0.466	0.764	" "
120	34.550	10.940	0.324	0.468	0.842	" "
121	35.000	43.130	1.277	0.475	3.147	" PR"
122	35.520	26.130	0.773	0.482	0.884	" "
123	35.980	13.560	0.401	0.488	0.803	" "
124	36.170	14.000	0.414	0.491	0.992	" "
125	36.450	8.988	0.266	0.494	0.717	" "
126	36.650	13.590	0.402	0.497	0.758	" "
127	36.930	4.772	0.141	0.501	0.694	" "
128	37.030	5.669	0.167	0.502	0.748	" "
129	37.150	8.504	0.251	0.504	0.752	" "
130	37.330	9.966	0.295	0.507	0.749	" "
131	37.750	30.650	0.907	0.512	2.199	" PH"
132	38.400	31.560	0.934	0.521	0.916	" "
133	38.770	12.130	0.359	0.526	0.730	" "
134	39.230	21.630	0.640	0.533	0.728	" "
135	39.570	9.238	0.273	0.537	0.690	" "
136	39.880	26.720	0.791	0.541	1.189	" "
137	40.400	13.450	0.398	0.549	0.719	" "
138	40.730	12.260	0.363	0.553	0.714	" "
139	41.020	12.640	0.374	0.557	0.678	" "
140	41.370	16.540	0.489	0.562	0.649	" "
141	41.850	13.060	0.386	0.568	0.642	" "
142	42.270	28.480	0.843	0.574	3.082	" IS"
143	42.450	11.920	0.352	0.577	0.772	" "
144	42.670	4.748	0.140	0.580	0.611	" "
145	42.770	8.343	0.247	0.581	0.624	" "
146	43.020	10.750	0.318	0.584	0.654	" "
147	43.500	26.730	0.791	0.591	0.633	" "
148	44.030	9.126	0.270	0.598	0.620	" "
149	44.380	13.870	0.410	0.603	0.921	" "
150	44.600	7.430	0.220	0.606	0.600	" "
151	44.880	16.220	0.480	0.610	0.632	" "
152	45.330	7.939	0.235	0.616	0.590	" "
153	45.430	6.765	0.200	0.618	0.601	" "
154	45.700	9.831	0.291	0.621	0.776	" "
155	45.870	12.800	0.379	0.623	0.635	" "
156	46.200	6.118	0.181	0.628	0.581	" "
157	46.450	10.990	0.325	0.631	0.602	" "
158	46.750	11.880	0.351	0.636	0.698	" "
159	46.980	4.082	0.120	0.639	0.624	" "

DRAFT

160	47.080	7.373	0.218	0.640	0.596	" "
161	47.300	4.578	0.135	0.643	0.623	" "
162	47.400	13.360	0.395	0.644	0.563	" "
163	47.780	3.987	0.118	0.650	0.593	" "
164	48.000	11.070	0.327	0.653	0.789	" "
165	48.200	10.550	0.312	0.655	0.599	" "
166	48.470	4.658	0.137	0.659	0.622	" "
167	48.570	7.739	0.229	0.660	0.678	" "
168	48.770	6.956	0.206	0.663	0.637	" "
169	48.970	8.028	0.237	0.666	0.630	" "
170	49.180	4.562	0.135	0.669	0.602	" "
171	49.480	15.510	0.459	0.673	0.637	" "
172	49.720	10.650	0.315	0.676	0.739	" "
173	50.170	16.470	0.487	0.682	0.657	" "
174	50.420	3.847	0.113	0.686	0.576	" "
175	50.830	15.060	0.445	0.691	0.598	" "
176	50.950	7.983	0.236	0.693	0.604	" "
177	51.270	7.253	0.214	0.697	0.606	" "
178	51.370	8.810	0.260	0.699	0.600	" "
179	51.830	16.040	0.475	0.705	0.630	" "
180	52.280	19.440	0.575	0.711	0.649	" "
181	52.570	4.112	0.121	0.715	0.619	" "
182	52.670	8.607	0.254	0.717	0.628	" "
183	53.050	17.380	0.514	0.722	0.641	" "
184	53.420	18.620	0.551	0.727	0.785	" "
185	53.830	4.114	0.121	0.733	0.619	" "
186	54.070	18.200	0.538	0.736	0.660	" "
187	54.500	16.230	0.480	0.742	0.821	" "
188	54.800	39.580	1.172	0.746	0.628	" "
189	55.970	18.830	0.557	0.762	0.750	" "
190	56.520	27.820	0.823	0.769	0.866	" "
191	56.930	16.600	0.491	0.775	0.766	" "
192	57.530	16.410	0.485	0.783	0.814	" "
193	57.650	9.560	0.283	0.785	0.801	" "
194	58.020	21.380	0.632	0.790	0.889	" "
195	58.400	15.390	0.455	0.795	0.828	" "
196	58.600	6.994	0.207	0.798	0.733	" "
197	58.850	11.630	0.344	0.801	0.875	" "
198	59.020	9.516	0.281	0.804	0.985	" "
199	59.150	6.627	0.196	0.805	0.926	" "
200	59.270	14.490	0.429	0.807	0.863	" "
201	59.580	13.110	0.388	0.811	0.986	" "
202	59.800	10.310	0.305	0.814	0.924	" "
203	59.970	5.469	0.161	0.817	0.822	" "
204	60.400	23.260	0.688	0.823	0.893	" "
205	60.600	10.920	0.323	0.825	0.906	" "
206	60.780	13.160	0.389	0.828	1.020	" "
207	60.950	8.575	0.253	0.830	0.929	" "
208	61.120	18.470	0.546	0.832	1.013	" "
209	61.430	27.330	0.809	0.837	0.985	" "
210	61.980	5.696	0.168	0.844	0.871	" "
211	62.150	17.590	0.520	0.846	1.057	" "
212	62.400	11.680	0.345	0.850	0.856	" "
213	62.680	12.590	0.372	0.854	0.762	" "
214	63.030	14.570	0.431	0.859	0.880	" "
215	63.200	7.350	0.217	0.861	0.826	" "
216	63.350	6.532	0.193	0.863	0.702	" "
217	63.500	6.353	0.188	0.865	0.679	" "
218	63.800	15.270	0.452	0.869	0.740	" "
219	64.020	27.510	0.814	0.872	0.692	" "

DRAFT

220	64.850	11.350	0.336	0.883	0.770	" "
221	65.020	10.970	0.324	0.886	0.580	" "
222	65.350	11.410	0.337	0.890	0.557	" "
223	65.730	10.310	0.305	0.896	0.538	" "
224	66.120	15.990	0.473	0.901	0.613	" "
225	66.630	17.150	0.507	0.908	0.546	" "
226	67.300	5.224	0.154	0.917	0.458	" "
227	67.400	4.339	0.128	0.918	0.452	" "
228	67.620	8.842	0.261	0.921	0.447	" "
229	67.950	2.961	0.087	0.926	0.411	" "
230	68.050	2.741	0.081	0.927	0.422	" "
231	68.180	5.954	0.176	0.929	0.466	" "
232	68.400	2.671	0.079	0.932	0.366	" "
233	68.500	2.592	0.076	0.933	0.468	" "
234	68.620	2.614	0.077	0.935	0.358	" "
235	68.720	3.353	0.099	0.936	0.408	" "
236	69.000	4.956	0.146	0.940	0.369	" "
237	69.100	11.390	0.337	0.942	0.351	" "
238	69.700	3.273	0.096	0.950	0.432	" "
239	69.820	2.431	0.071	0.952	0.392	" "
240	69.920	9.271	0.274	0.953	0.385	" "
241	70.580	5.615	0.166	0.962	0.277	" "
242	71.250	8.216	0.243	0.971	0.353	" "
243	71.370	2.436	0.072	0.973	0.302	" "
244	71.480	3.548	0.105	0.974	0.305	" "
245	71.900	5.297	0.156	0.980	0.246	" "
246	72.170	1.370	0.040	0.984	0.238	" "
247	72.270	2.088	0.061	0.985	0.198	" "
248	72.720	6.195	0.183	0.991	0.234	" "
249	73.080	3.790	0.112	0.996	0.243	" "
250	73.280	1.771	0.052	0.999	0.298	" "
251	73.400	4.917	0.145	1.001	0.338	" "
252	73.700	1.825	0.054	1.005	0.157	" "
253	73.920	0.870	0.025	1.008	0.150	" "
254	74.030	1.004	0.029	1.010	0.149	" "
255	74.150	0.932	0.027	1.011	0.139	" "
256	74.250	1.360	0.040	1.013	0.142	" "
257	74.450	2.019	0.059	1.015	0.142	" "
258	74.730	1.528	0.045	1.019	0.115	" "
259	75.170	2.837	0.083	1.025	0.137	" "
260	75.400	1.068	0.031	1.028	0.106	" "
261	75.620	0.581	0.017	1.031	0.102	" "
262	75.830	0.744	0.022	1.034	0.087	" "
263	76.150	1.593	0.047	1.039	0.101	" "
264	76.300	0.470	0.013	1.041	0.096	
265	76.470	1.741	0.051	1.043	0.137	
266	76.800	0.845	0.025	1.048	0.060	
267	77.150	0.511	0.015	1.052	0.056	
268	77.380	0.048	0.001	1.098	0.022	

DRA

FID

Analysis Start Date: JUNE 7, 1994 Time: 10:00:49.13

***** GGC Data Header *****
 Global Geochemistry Corporation
 RS17 5.5-6
 File: C15702

***** END GGC Header *****

PEAK AREAS:

index	time(min)	area	area(%)	baseline(V)	height(V)	
1	5.850	0.319	0.013	0.827	0.092	""
2	6.267	0.153	0.006	0.821	0.032	""
3	7.317	0.198	0.008	0.816	0.035	""
4	7.917	0.196	0.008	0.813	0.035	""
5	8.700	0.391	0.016	0.814	0.034	""
6	9.067	0.499	0.021	0.817	0.048	""
7	9.583	0.354	0.015	0.814	0.096	""
8	9.833	0.163	0.006	0.812	0.018	""
9	10.100	0.374	0.015	0.815	0.024	""
10	11.630	0.505	0.021	0.817	0.021	""
11	12.080	0.157	0.006	0.825	0.021	""
12	12.320	0.443	0.018	0.822	0.052	""
13	12.800	0.359	0.015	0.822	0.058	""
14	13.020	0.323	0.013	0.822	0.054	""
15	13.930	0.584	0.024	0.826	0.049	""
16	14.550	0.331	0.014	0.832	0.024	""
17	15.170	0.469	0.020	0.828	0.096	""
18	15.730	0.487	0.020	0.836	0.100	""
19	16.220	0.170	0.007	0.842	0.043	""
20	17.300	0.736	0.031	0.837	0.032	""
21	17.450	0.123	0.005	0.838	0.025	""
22	17.800	0.744	0.031	0.841	0.061	""
23	18.380	1.192	0.050	0.845	0.058	""
24	18.620	0.289	0.012	0.847	0.041	""
25	18.880	0.157	0.006	0.850	0.026	""
26	19.400	1.592	0.067	0.857	0.177	"i13"
27	19.720	0.325	0.013	0.862	0.042	""
28	19.980	0.759	0.032	0.866	0.057	""
29	20.250	0.399	0.017	0.870	0.064	""
30	20.580	0.543	0.023	0.875	0.077	""
31	20.730	0.713	0.030	0.877	0.074	""
32	21.070	0.551	0.023	0.882	0.053	""
33	21.500	3.082	0.131	0.889	0.535	"i14"
34	21.670	0.370	0.015	0.892	0.067	""
35	21.820	0.623	0.026	0.895	0.063	""
36	22.170	0.266	0.011	0.902	0.045	""
37	22.780	0.242	0.010	0.925	0.040	""
38	22.950	0.695	0.029	0.920	0.066	""
39	23.320	0.437	0.018	0.913	0.096	""

40	23.570	0.250	0.010	0.922	0.035	"
41	24.670	0.160	0.006	0.955	0.028	"
42	25.000	3.901	0.166	0.956	0.599	"i15"
43	25.300	1.264	0.053	0.957	0.094	"
44	25.880	0.636	0.027	0.960	0.071	"
45	26.170	0.475	0.020	0.961	0.074	"
46	26.330	0.489	0.020	0.962	0.069	"
47	26.680	1.453	0.062	0.963	0.068	"
48	27.020	1.120	0.047	0.965	0.092	"
49	27.300	1.030	0.043	0.966	0.093	"
50	27.750	4.978	0.212	0.968	0.715	"i16"
51	27.970	1.650	0.070	0.969	0.163	"
52	28.300	2.252	0.096	0.970	0.142	"
53	28.580	1.073	0.045	0.972	0.105	"
54	28.700	0.942	0.040	0.972	0.110	"
55	28.880	1.387	0.059	0.973	0.147	"
56	29.100	1.122	0.047	0.974	0.114	"
57	29.850	4.751	0.202	0.977	0.147	"
58	30.220	2.812	0.120	0.979	0.158	"
59	30.580	3.740	0.159	0.980	0.211	"
60	30.930	3.353	0.143	0.982	0.279	"
61	31.130	1.663	0.070	0.983	0.146	"
62	31.420	2.965	0.126	0.984	0.178	"
63	31.850	5.596	0.238	0.986	0.218	"
64	32.150	1.469	0.062	0.987	0.192	"
65	32.430	3.534	0.150	0.988	0.200	"
66	32.680	2.725	0.116	0.989	0.193	"
67	33.380	8.938	0.381	0.992	0.345	"i18"
68	33.600	3.968	0.169	0.993	0.289	"
69	33.830	4.681	0.199	0.994	0.381	"
70	34.050	6.364	0.271	0.995	0.320	"
71	35.020	29.420	1.256	0.999	1.779	"PR"
72	35.570	10.790	0.460	1.002	0.488	"
73	35.970	7.844	0.334	1.004	0.397	"
74	36.300	4.455	0.190	1.005	0.421	"
75	36.750	16.960	0.723	1.007	0.467	"
76	37.430	13.150	0.561	1.010	0.503	"
77	37.820	25.440	1.086	1.012	1.676	"PH"
78	38.550	19.560	0.834	1.015	0.637	"
79	38.880	9.738	0.415	1.017	0.551	"
80	39.180	9.483	0.404	1.018	0.664	"
81	39.320	7.101	0.303	1.018	0.632	"
82	39.720	12.390	0.528	1.020	0.650	"
83	39.970	19.350	0.826	1.021	1.043	"
84	40.280	7.073	0.301	1.023	0.605	"
85	40.470	10.860	0.463	1.023	0.727	"
86	40.850	10.350	0.441	1.025	0.727	"
87	41.070	9.444	0.403	1.026	0.765	"
88	41.180	10.810	0.461	1.026	0.730	"
89	41.430	9.239	0.394	1.028	0.722	"
90	41.650	10.020	0.427	1.028	0.707	"
91	41.900	7.994	0.341	1.030	0.810	"
92	42.330	38.400	1.639	1.031	3.154	"IS"
93	42.530	11.770	0.502	1.032	0.990	"
94	42.830	13.530	0.577	1.034	0.822	"
95	43.420	21.920	0.935	1.036	0.773	"
96	43.600	11.940	0.509	1.037	0.889	"
97	43.970	16.490	0.703	1.038	0.798	"
98	44.180	10.260	0.438	1.039	0.803	"
99	44.320	9.517	0.406	1.040	0.834	"

100	44.500	10.870	0.463	1.041	0.961	" "
101	44.700	10.490	0.447	1.042	0.862	" "
102	44.930	22.420	0.956	1.043	0.975	" "
103	45.430	17.730	0.756	1.045	0.914	" "
104	45.780	39.150	1.671	1.046	1.142	" "
105	46.550	17.520	0.747	1.050	0.920	" "
106	46.830	22.800	0.973	1.051	1.054	" "
107	47.170	35.360	1.509	1.052	1.070	" "
108	47.680	41.540	1.773	1.055	1.072	" "
109	48.700	30.740	1.312	1.059	1.122	" "
110	48.800	8.200	0.350	1.059	1.146	" "
111	48.920	7.280	0.310	1.060	1.186	" "
112	49.100	18.000	0.768	1.061	1.262	" "
113	49.320	16.550	0.706	1.062	1.104	" "
114	49.530	9.111	0.388	1.063	1.267	" "
115	49.670	8.800	0.375	1.063	1.205	" "
116	49.770	24.460	1.044	1.064	1.292	" "
117	50.250	28.470	1.215	1.066	1.247	" "
118	50.530	26.220	1.119	1.067	1.111	" "
119	50.930	8.911	0.380	1.069	1.204	" "
120	51.050	25.160	1.074	1.069	1.179	" "
121	51.430	15.760	0.672	1.071	1.168	" "
122	51.630	7.910	0.337	1.072	1.197	" "
123	51.980	43.320	1.849	1.073	1.289	" "
124	52.350	23.850	1.018	1.075	1.287	" "
125	52.700	9.312	0.397	1.076	1.267	" "
126	52.800	17.000	0.725	1.077	1.161	" "
127	53.150	17.030	0.726	1.078	1.331	" "
128	53.370	25.590	1.092	1.079	1.303	" "
129	53.600	16.550	0.706	1.080	1.276	" "
130	53.830	12.020	0.512	1.081	1.274	" "
131	53.970	10.640	0.454	1.082	1.253	" "
132	54.220	18.080	0.771	1.083	1.292	" "
133	54.470	18.820	0.803	1.084	1.346	" "
134	54.630	40.730	1.738	1.085	1.494	" "
135	55.080	9.615	0.410	1.087	1.302	" "
136	55.220	28.350	1.210	1.087	1.381	" "
137	55.530	8.671	0.370	1.088	1.293	" "
138	55.680	20.010	0.853	1.089	1.349	" "
139	55.930	12.360	0.527	1.090	1.274	" "
140	56.100	27.090	1.156	1.091	1.453	" "
141	56.350	10.430	0.445	1.092	1.418	" "
142	56.600	23.340	0.996	1.093	1.694	" "
143	56.720	13.870	0.591	1.094	1.489	" "
144	56.870	9.738	0.415	1.094	1.480	" "
145	57.070	59.530	2.541	1.095	1.508	" "
146	57.670	10.740	0.458	1.098	1.706	" "
147	57.800	28.800	1.229	1.098	1.596	" "
148	58.170	21.020	0.897	1.100	1.788	" "
149	58.300	13.250	0.565	1.100	1.598	" "
150	58.530	36.120	1.542	1.101	1.679	" "
151	58.780	13.290	0.567	1.102	1.586	" "
152	58.920	10.800	0.460	1.103	1.660	" "
153	59.020	13.170	0.562	1.103	1.771	" "
154	59.180	17.370	0.741	1.104	1.937	" "
155	59.320	14.670	0.626	1.105	1.796	" "
156	59.420	19.990	0.853	1.105	1.661	" "
157	59.620	12.390	0.528	1.106	1.666	" "
158	59.730	24.110	1.029	1.107	1.849	" "
159	59.950	18.570	0.792	1.108	1.876	" "

160	60.300	33.760	1.441	1.109	1.729	" "
161	60.600	23.580	1.007	1.110	1.808	" "
162	60.700	20.750	0.885	1.111	1.782	" "
163	60.970	21.440	0.914	1.112	1.896	" "
164	61.130	19.820	0.845	1.113	1.956	" "
165	61.280	24.900	1.063	1.113	1.771	" "
166	61.620	24.960	1.065	1.115	1.786	" "
167	61.800	10.560	0.450	1.116	1.445	" "
168	61.930	22.460	0.958	1.116	1.492	" "
169	62.200	13.970	0.596	1.117	1.855	" "
170	62.320	30.890	1.319	1.118	1.712	" "
171	62.650	31.590	1.348	1.119	1.594	" "
172	63.130	16.160	0.689	1.121	1.255	" "
173	63.300	12.860	0.548	1.122	1.497	" "
174	63.450	23.030	0.982	1.123	1.326	" "
175	63.750	13.190	0.562	1.124	1.215	" "
176	63.950	26.650	1.137	1.125	1.156	" "
177	64.350	28.320	1.209	1.127	1.150	" "
178	65.100	40.320	1.721	1.130	1.170	" "
179	65.620	5.566	0.237	1.132	0.780	" "
180	65.730	11.350	0.484	1.133	0.722	" "
181	66.030	6.108	0.260	1.134	0.749	" "
182	66.230	8.262	0.352	1.135	0.803	" "
183	66.380	8.699	0.371	1.135	0.873	" "
184	66.550	8.319	0.355	1.136	0.718	" "
185	66.770	7.683	0.327	1.137	0.669	" "
186	66.930	7.956	0.339	1.138	0.631	" "
187	67.270	17.960	0.766	1.139	0.676	" "
188	67.680	6.332	0.270	1.141	0.589	" "
189	67.900	7.138	0.304	1.142	0.643	" "
190	68.100	12.360	0.527	1.143	0.603	" "
191	68.650	7.860	0.335	1.145	0.475	" "
192	69.030	17.190	0.733	1.147	0.454	" "
193	69.550	5.235	0.223	1.149	0.437	" "
194	69.870	6.267	0.267	1.150	0.450	" "
195	70.030	2.987	0.127	1.151	0.499	" "
196	70.130	5.983	0.255	1.152	0.506	" "
197	70.520	5.538	0.236	1.153	0.370	" "
198	70.750	8.954	0.382	1.154	0.391	" "
199	71.270	3.950	0.168	1.156	0.319	" "
200	71.530	1.750	0.074	1.158	0.325	" "
201	71.870	6.336	0.270	1.159	0.310	" "
202	72.070	2.570	0.109	1.160	0.264	" "
203	72.230	1.478	0.063	1.161	0.277	" "
204	72.420	4.926	0.210	1.161	0.217	" "
205	72.920	4.981	0.212	1.164	0.248	" "
206	73.300	2.500	0.106	1.165	0.223	" "
207	73.500	2.607	0.111	1.166	0.299	" "
208	73.600	2.458	0.104	1.166	0.337	" "
209	73.750	5.697	0.243	1.167	0.313	" "
210	74.120	0.934	0.039	1.169	0.162	" "
211	74.250	1.314	0.056	1.169	0.175	" "
212	74.350	1.591	0.067	1.170	0.177	" "
213	74.550	0.778	0.033	1.171	0.176	" "
214	74.650	1.086	0.046	1.171	0.197	" "
215	74.780	1.452	0.061	1.172	0.159	" "
216	74.980	2.075	0.088	1.172	0.123	" "
217	75.600	2.179	0.093	1.175	0.132	" "
218	75.820	0.862	0.036	1.176	0.111	" "
219	75.970	1.178	0.050	1.177	0.096	" "

220	76.470	1.118	0.047	1.182	0.111	" "
221	76.570	0.386	0.016	1.184	0.076	
222	76.720	0.488	0.020	1.186	0.112	
223	76.820	0.466	0.019	1.188	0.091	
224	76.920	0.548	0.023	1.190	0.093	
225	77.070	0.235	0.010	1.192	0.064	
226	77.170	0.104	0.004	1.197	0.039	

DR 267

LABTECH CHROM V1.40

DATA

Analysis Start Date: JUNE 7, 1994 Time: 10:00:27.27

***** GGC Data Header *****

Global Geochemistry Corporation

RS15 15.5-16

File: C15701

***** END GGC Header *****

PEAK AREAS:

index	time(min)	area	area(#)	baseline(V)	height(V)	
1	4.900	2.362	0.077	0.828	0.198	""
2	5.650	0.615	0.020	0.857	0.035	""
3	5.917	1.033	0.033	0.842	0.228	""
4	6.350	0.596	0.019	0.823	0.118	""
5	7.017	0.347	0.011	0.816	0.065	""
6	7.200	0.231	0.007	0.809	0.039	""
7	7.417	0.998	0.032	0.803	0.150	""
8	8.017	0.677	0.022	0.815	0.134	""
9	8.350	0.788	0.025	0.804	0.166	""
10	8.550	0.355	0.011	0.804	0.043	""
11	8.817	0.811	0.026	0.804	0.166	""
12	9.033	0.321	0.010	0.804	0.061	""
13	9.183	2.059	0.067	0.803	0.345	""
14	9.417	0.919	0.030	0.803	0.190	""
15	9.550	0.407	0.013	0.803	0.075	""
16	9.717	1.149	0.037	0.803	0.296	""
17	9.883	0.787	0.025	0.803	0.087	""
18	10.180	1.463	0.048	0.803	0.131	""
19	10.370	0.608	0.020	0.802	0.102	""
20	10.470	0.930	0.030	0.802	0.119	""
21	10.770	0.966	0.031	0.802	0.116	""
22	10.870	1.358	0.044	0.802	0.169	""
23	11.230	0.577	0.018	0.802	0.108	""
24	11.570	2.105	0.069	0.804	0.195	""
25	11.780	0.638	0.021	0.806	0.102	""
26	12.220	1.679	0.055	0.808	0.138	""
27	12.480	3.028	0.099	0.810	0.613	""
28	12.670	1.278	0.042	0.811	0.138	""
29	12.950	2.403	0.079	0.813	0.197	""
30	13.180	2.099	0.069	0.815	0.342	""
31	13.430	1.068	0.035	0.816	0.102	""
32	13.770	1.691	0.055	0.818	0.169	""
33	14.100	2.402	0.079	0.820	0.230	""
34	14.250	1.304	0.042	0.821	0.132	""
35	14.570	2.490	0.081	0.823	0.147	""
36	14.900	1.688	0.055	0.825	0.117	""
37	15.180	0.446	0.014	0.827	0.087	""
38	15.330	3.024	0.099	0.828	0.541	""
39	15.600	1.399	0.046	0.830	0.078	""

40	15.920	2.789	0.091	0.832	0.476	""
41	16.050	1.326	0.043	0.832	0.185	""
42	16.380	4.056	0.133	0.834	0.382	""
43	16.770	2.023	0.066	0.837	0.137	""
44	17.020	1.165	0.038	0.838	0.136	""
45	17.180	1.575	0.051	0.839	0.144	""
46	17.380	3.638	0.119	0.841	0.257	""
47	17.830	2.025	0.066	0.844	0.245	""
48	17.970	2.771	0.091	0.844	0.344	""
49	18.130	1.311	0.043	0.845	0.202	""
50	18.250	2.934	0.096	0.846	0.193	""
51	18.580	3.120	0.102	0.848	0.224	""
52	18.800	2.061	0.067	0.850	0.185	""
53	19.030	1.525	0.050	0.851	0.167	""
54	19.270	2.287	0.075	0.852	0.132	""
55	19.600	9.589	0.315	0.855	1.274	"i13"
56	19.920	2.316	0.076	0.857	0.235	""
57	20.180	4.660	0.153	0.858	0.302	""
58	20.450	3.240	0.106	0.860	0.288	""
59	20.780	3.128	0.102	0.862	0.267	""
60	20.930	5.353	0.176	0.863	0.376	""
61	21.300	4.462	0.146	0.865	0.448	""
62	21.720	15.030	0.494	0.868	1.909	"i14"
63	21.880	2.436	0.080	0.869	0.330	""
64	22.050	2.631	0.086	0.870	0.341	""
65	22.370	5.282	0.173	0.872	0.265	""
66	22.550	1.591	0.052	0.873	0.233	""
67	22.680	3.208	0.105	0.874	0.228	""
68	23.000	3.067	0.100	0.876	0.295	""
69	23.220	7.167	0.235	0.877	0.553	""
70	23.550	2.726	0.089	0.879	0.317	""
71	23.800	3.499	0.115	0.881	0.318	""
72	23.950	4.649	0.152	0.882	0.244	""
73	24.300	1.848	0.060	0.884	0.275	""
74	24.400	1.563	0.051	0.885	0.254	""
75	24.570	3.102	0.102	0.886	0.314	""
76	24.680	3.553	0.116	0.886	0.303	""
77	25.230	18.310	0.602	0.890	1.957	"i15"
78	25.330	2.565	0.084	0.890	0.390	""
79	25.520	9.594	0.315	0.891	0.602	""
80	25.900	3.669	0.120	0.894	0.435	""
81	26.080	7.679	0.252	0.895	0.569	"14"
82	26.380	2.437	0.080	0.897	0.306	""
83	26.550	7.031	0.231	0.898	0.311	""
84	26.920	2.579	0.084	0.900	0.295	""
85	27.230	7.084	0.233	0.902	0.403	""
86	27.520	3.923	0.129	0.904	0.363	""
87	27.630	2.358	0.077	0.905	0.320	""
88	27.980	17.200	0.565	0.907	1.995	"i16"
89	28.180	6.844	0.225	0.908	0.469	""
90	28.430	2.825	0.092	0.910	0.386	""
91	28.530	4.819	0.158	0.910	0.446	""
92	28.800	3.865	0.127	0.912	0.390	""
93	29.080	11.280	0.371	0.914	0.820	"15"
94	29.380	3.529	0.116	0.916	0.336	""
95	29.570	4.531	0.149	0.917	0.445	""
96	29.680	2.159	0.071	0.917	0.376	""
97	29.780	3.438	0.113	0.918	0.321	""
98	30.070	6.251	0.205	0.920	0.469	""
99	30.480	9.726	0.319	0.922	0.537	""

100	30.820	9.712	0.319	0.925	0.666	"
101	31.130	9.755	0.320	0.927	0.629	"
102	31.380	3.272	0.107	0.928	0.319	"
103	31.900	11.110	0.365	0.931	0.603	"
104	32.100	10.650	0.350	0.933	1.064	"16"
105	32.270	2.533	0.083	0.934	0.390	"
106	32.380	6.855	0.225	0.934	0.409	"
107	32.670	5.586	0.183	0.936	0.411	"
108	32.930	3.401	0.111	0.938	0.382	"
109	33.320	8.140	0.267	0.940	0.449	"
110	33.620	22.050	0.725	0.942	1.898	"i18"
111	33.800	5.385	0.177	0.943	0.599	"
112	34.120	10.760	0.354	0.945	0.643	"
113	34.300	6.487	0.213	0.946	0.547	"
114	34.520	4.560	0.150	0.948	0.491	"
115	34.670	4.702	0.154	0.949	0.512	"
116	34.970	15.620	0.513	0.950	1.249	"17"
117	35.270	35.580	1.170	0.952	3.013	"PR"
118	35.700	7.053	0.232	0.955	0.600	"
119	35.800	13.630	0.448	0.956	0.758	"
120	36.280	8.508	0.279	0.959	0.660	"
121	36.450	12.480	0.410	0.960	0.831	"
122	36.720	4.851	0.159	0.961	0.576	"
123	37.050	17.160	0.564	0.963	0.681	"
124	37.270	4.223	0.138	0.965	0.640	"
125	37.370	7.799	0.256	0.965	0.725	"
126	37.700	19.180	0.630	0.968	1.415	"18"
127	38.050	27.290	0.897	0.970	2.638	"PH"
128	38.200	7.999	0.263	0.971	0.657	"
129	38.430	5.645	0.185	0.972	0.669	"
130	38.700	38.160	1.255	0.974	1.004	"
131	39.380	6.866	0.225	0.978	0.826	"
132	39.530	7.908	0.260	0.979	0.838	"
133	39.700	10.190	0.335	0.980	0.783	"
134	39.900	7.888	0.259	0.981	0.758	"
135	40.200	37.770	1.242	0.983	1.879	"19"
136	40.700	12.650	0.416	0.986	0.817	"
137	41.030	15.080	0.496	0.988	0.871	"
138	41.320	17.560	0.577	0.990	0.880	"
139	41.770	13.710	0.451	0.993	0.837	"
140	41.870	8.497	0.279	0.994	0.839	"
141	42.150	11.880	0.390	0.995	0.856	"
142	42.580	41.980	1.381	0.998	2.769	"IS"
143	42.780	16.610	0.546	0.999	2.018	"20"
144	42.950	5.504	0.181	1.001	0.826	"
145	43.150	10.980	0.361	1.002	0.835	"
146	43.270	10.160	0.334	1.003	0.837	"
147	43.770	27.030	0.889	1.006	0.911	"
148	44.170	27.010	0.888	1.008	0.860	"
149	44.700	26.210	0.862	1.012	1.240	"
150	45.150	19.840	0.652	1.014	1.751	"21"
151	45.330	19.370	0.637	1.016	0.978	"
152	45.630	15.500	0.509	1.017	0.932	"
153	46.020	16.420	0.540	1.020	1.234	"
154	46.200	13.590	0.446	1.021	1.006	"
155	46.420	11.960	0.393	1.022	0.911	"
156	46.620	6.225	0.204	1.024	0.974	"
157	46.820	13.750	0.452	1.025	1.004	"
158	47.050	14.390	0.473	1.026	1.082	"
159	47.430	35.210	1.158	1.029	1.798	"22"

160	47.700	23.820	0.783	1.030	0.936	" "
161	48.230	14.290	0.470	1.034	1.154	" "
162	48.330	13.010	0.427	1.034	1.306	" "
163	48.530	14.570	0.479	1.036	1.067	" "
164	48.850	19.720	0.648	1.038	1.172	" "
165	49.050	7.847	0.258	1.039	1.026	" "
166	49.180	8.057	0.265	1.040	1.069	" "
167	49.300	11.910	0.391	1.040	1.093	" "
168	49.580	20.920	0.688	1.042	2.089	"23"
169	49.780	19.630	0.645	1.043	1.249	" "
170	50.030	24.380	0.801	1.045	1.389	" "
171	50.370	8.305	0.273	1.047	1.140	" "
172	50.480	47.220	1.553	1.048	1.205	" "
173	51.200	8.337	0.274	1.052	1.130	" "
174	51.320	13.440	0.442	1.053	1.168	" "
175	51.670	27.090	0.891	1.055	2.307	"24"
176	51.970	16.640	0.547	1.057	1.173	" "
177	52.150	48.540	1.597	1.058	1.203	" "
178	52.800	22.510	0.740	1.062	1.250	" "
179	53.100	29.350	0.965	1.064	1.182	" "
180	53.680	39.000	1.283	1.068	2.017	"25"
181	53.970	9.393	0.309	1.069	1.313	" "
182	54.070	8.355	0.274	1.070	1.357	" "
183	54.200	10.480	0.344	1.071	1.334	" "
184	54.300	8.064	0.265	1.072	1.221	" "
185	54.480	23.010	0.756	1.073	1.276	" "
186	54.730	11.680	0.384	1.074	1.384	" "
187	54.830	20.330	0.668	1.075	1.738	" "
188	55.050	8.687	0.285	1.076	1.322	" "
189	55.600	52.920	1.741	1.080	1.853	"26"
190	55.780	10.840	0.356	1.081	1.521	" "
191	56.320	68.060	2.239	1.084	1.557	" "
192	56.820	27.990	0.920	1.087	1.728	" "
193	57.020	24.880	0.818	1.089	1.666	" "
194	57.470	53.480	1.759	1.091	1.995	"27"
195	58.030	42.660	1.403	1.095	1.715	" "
196	58.300	69.700	2.293	1.097	1.886	" "
197	58.970	11.560	0.380	1.101	1.554	" "
198	59.300	51.700	1.700	1.103	2.424	"28"
199	59.550	18.120	0.596	1.104	2.056	" "
200	59.670	11.790	0.387	1.105	1.835	" "
201	59.770	16.770	0.551	1.106	1.802	" "
202	60.130	60.810	2.000	1.108	2.073	" "
203	60.780	55.380	1.822	1.112	1.956	" "
204	60.980	14.190	0.466	1.113	1.861	" "
205	61.100	17.520	0.576	1.114	2.284	" "
206	61.220	18.630	0.612	1.115	2.291	" "
207	61.370	16.220	0.533	1.116	2.079	"29"
208	61.570	32.430	1.067	1.117	1.926	" "
209	61.800	11.720	0.385	1.118	1.787	" "
210	61.900	28.050	0.922	1.119	2.006	" "
211	62.220	24.220	0.796	1.121	1.574	" "
212	62.650	54.670	1.798	1.124	1.954	" "
213	62.950	17.080	0.561	1.126	2.038	"30"
214	63.570	52.820	1.737	1.129	1.795	" "
215	63.700	15.340	0.504	1.130	1.729	" "
216	63.850	27.820	0.915	1.131	1.473	" "
217	64.350	20.020	0.658	1.134	1.385	" "
218	64.470	11.750	0.386	1.135	1.249	" "
219	64.730	33.190	1.092	1.137	1.459	" "

220	65.050	11.280	0.371	1.139	1.534	"31"
221	65.250	18.680	0.614	1.140	1.274	" "
222	65.520	40.580	1.335	1.142	1.575	" "
223	66.370	30.460	1.002	1.147	1.012	" "
224	66.700	28.920	0.951	1.149	1.002	" "
225	67.250	10.610	0.348	1.152	0.870	" "
226	67.480	18.030	0.593	1.154	1.074	" "
227	67.820	7.033	0.231	1.156	0.685	" "
228	67.980	19.490	0.641	1.157	0.842	" "
229	68.450	8.495	0.279	1.160	0.728	" "
230	68.820	14.800	0.486	1.162	0.717	" "
231	69.250	15.850	0.521	1.165	0.775	" "
232	69.480	8.084	0.265	1.166	0.706	" "
233	69.720	7.468	0.245	1.168	0.629	" "
234	69.950	6.654	0.218	1.169	0.569	" "
235	70.430	19.360	0.636	1.172	0.756	" "
236	70.700	7.632	0.251	1.174	0.586	" "
237	70.950	3.195	0.105	1.175	0.477	" "
238	71.070	8.691	0.285	1.176	0.466	" "
239	71.470	4.467	0.146	1.179	0.400	" "
240	72.020	11.960	0.393	1.182	0.596	" "
241	72.150	3.300	0.108	1.183	0.582	" "
242	72.320	6.097	0.200	1.184	0.407	" "
243	72.600	5.035	0.165	1.186	0.419	" "
244	72.930	4.786	0.157	1.188	0.319	" "
245	73.130	1.674	0.055	1.189	0.274	" "
246	73.230	1.840	0.060	1.190	0.325	" "
247	73.430	2.975	0.097	1.191	0.321	" "
248	73.530	3.991	0.131	1.192	0.359	" "
249	73.950	6.906	0.227	1.194	0.502	" "
250	74.100	5.167	0.170	1.195	0.533	" "
251	74.270	4.385	0.144	1.196	0.586	" "
252	74.400	3.699	0.121	1.197	0.430	" "
253	74.570	2.394	0.078	1.198	0.293	" "
254	74.800	2.059	0.067	1.199	0.210	" "
255	75.120	4.655	0.153	1.201	0.293	" "
256	75.400	2.277	0.074	1.203	0.214	" "
257	75.630	1.119	0.036	1.205	0.152	" "
258	75.830	1.737	0.057	1.206	0.187	" "
259	75.970	1.525	0.050	1.207	0.284	" "
260	76.100	3.192	0.105	1.208	0.187	" "
261	76.730	2.474	0.081	1.212	0.187	" "
262	76.870	0.628	0.020	1.212	0.157	" "
263	76.970	2.228	0.073	1.213	0.161	" "

DRAFT

APPENDIX E

APPENDIX E
BIOTREATABILITY REPORT

APPENDIX E

BIOTREATABILITY REPORT

INTRODUCTION

This report presents the findings of Harding Lawson Associates' (HLA) laboratory evaluation study to assess the applicability of using biological treatment for remediation of soil containing total recoverable petroleum hydrocarbons (TRPH) at Texaco-Walker Property Site in Santa Fe Springs, California.

The purpose of this study was twofold: to evaluate inorganic chemistry and microbiological constituents that would require enhancement in order to optimize the biological degradation of TRPH present in soil, and to perform a laboratory study to evaluate the effectiveness of surface biological treatment techniques to enhance removal of TRPH. The laboratory evaluation was designed to:

- Evaluate the existing microbial populations capable of degrading TRPH in site soil samples
- Evaluate soil chemistry factors that could influence the rate of biological degradation of TRPH in site samples
- Perform a laboratory-scale simulation of a surface biological treatment process.

SAMPLE ANALYSIS AND INTERPRETATION OF RESULTS

Sample Collection

The soil sampling areas were selected to represent the typical levels of TRPH and predominant soil stratigraphy at the Texaco-Walker Property site. Twelve soil samples, each weighing approximately 800 grams were collected from Boring LS-10 (0.5 feet and 5.5 feet), RS-13 (10.0 feet and 15.0 feet), RS-14 (5.5 feet and 35.5 feet), RS-16 (15.5 feet and 25.5 feet) on May 12, 1994, and LS-9 (9.5 feet and 19.5 feet), RS-12 (1.5 feet and 5.5 feet) on May 13, 1994. The soil samples were shipped to HLA's bioremediation laboratory and utilized in the microbial, inorganic chemistry, and simulation evaluations.

Microbial Populations in Soil

Each soil sample were analyzed at HLA's bioremediation laboratory to estimate the total heterotrophic microbial population and the microbial population capable of utilizing TRPH (in the diesel range) as a source of carbon and energy.

The evaluation estimated the total number of microorganisms per gram of sample and, of these, those microorganisms that have the metabolic capability to use hydrocarbons as a primary source of carbon and energy. Microorganisms capable of degrading TRPH were present in each sample and the percentage of hydrocarbon-utilizers as a portion of the total population ranged from 0.76 to 37 percent. Results of the microbial evaluation of the soil samples are summarized in Table 1, and are within a range acceptable for biological degradation.

The results indicate that the existing microbial population in soil includes a subpopulation of microorganisms capable of degrading petroleum hydrocarbons. Stimulation of the hydrocarbon-utilizing microorganisms with the proper nutrients and oxygen should increase their percentage of the total microbial population and result in a significant decrease in the concentration of TRPH in the soil.

Microenvironmental Factors in Soil

Soil chemistry profiles, which included sample pH and water soluble concentrations of nitrogen as ammonia and nitrate, phosphorus as orthophosphate, sulfate, iron, manganese, magnesium, calcium, and potassium were developed for two composite soil samples. The soil composite samples consisted of one for silts and clays, (mud), (LS-9 at 9.5 feet, LS-10 at 0.5 feet and 5.5 feet, RS-12 at 1.5 feet and 5.5 feet) and one for sands (LS-9 at 19.5 feet, RS-13 at 15.0 feet, RS-14 at 35.5 feet). The results of the soil chemistry analysis are summarized in Table 2.

Generally, acceptable concentrations of key inorganic nutrients necessary to sustain microbial metabolism are as follows:

- Nitrogen as nitrate or ammonia - 10 milligrams (mg) per 100 mg hydrocarbon
- Phosphorus as orthophosphate - 1 mg per 100 mg hydrocarbon.

Comparison of the analytical results to these requirements indicates that the low concentrations of nitrogen as nitrate or ammonia in the soil may be limiting the potential for microbial degradation of the petroleum hydrocarbons. Therefore, stimulation of the indigenous microbial population capable of degrading petroleum hydrocarbons will require the addition of nitrate or ammonia, in a form readily available to the microorganisms.

Biological Treatment Simulation

A laboratory scale treatment system was constructed to simulate conditions under which the bioremediation process would be implemented in the field. The treatment system consisted of 5 teflon-coated pans (8x8x2) with 1,000 grams of soil in each. First, the soil samples were separated by soil type, mud (LS-9 at 9.5 feet, LS-10 at 0.5 feet, RS-12 at 5.5 feet, RS-14 at 5.5 feet, and RS-16 at 25.5), and sands (LS-9 at 19.5 feet, RS-13 at 10.0 and 15.0, RS-14 at 35.5 feet, and RS-16 at 15.5 feet). Second, 500 grams of each soil sample by soil type were composited creating a 2,500 gram composite of mud and a 2,500 gram composite of sand. Third, these composites were then separated to create the five composite samples of 1,000 grams each consisting of 100 percent mud, 100 percent sand, 50 percent mud to 50 percent sand, 75 percent mud to 25 percent sand, and 75 percent sand to 25 percent mud. Baseline parameters including total recoverable petroleum hydrocarbons (TRPH) as oil and grease by EPA Test Method 418.1 and microbial populations were measured for the soil in the five treatment systems.

During an 8 week treatment period, the 5 soil composites were amended with a specific nutrient formulation (HLA-200) on Day 0, 7, 21, and 34. Each composite was mechanically aerated every work day (Monday through Friday) to provide oxygen for microbial metabolism, and water was added to maintain soil moisture. Soil samples were collected from the five composites (Day 7, 17, 27, 45, and 56) and analyzed for TRPH by Method 418.1. Additionally, soil samples were collected and analyzed for microbial populations on Day 7, 17, 27, 45, and 56.

The hydrocarbon utilizer (HCU) populations in the soil composites were determined during the treatment period and the results are summarized in Plates 1 and 2. The initial HCU population increased approximately three orders of magnitude in the test soil composites, except the 100 percent mud composite which increased 2 orders of magnitude. These results indicate that conditions conducive for enhancement of the HCU population were present during the treatment period.

Plate 3 summarizes the reduction in soil TRPH concentrations during the 8 week study. The initial concentrations of TRPH as oil and grease were reduced approximately 35, 64, 44, 21, and 49 percent for

the composites of 100 percent mud, 100 percent sand, 50 percent mud to 50 percent sand, 75 percent mud to 25 percent sand, and 75 percent sand to 25 percent mud, respectively, during the treatment period.

The half-life of TRPH in the laboratory treatment systems were calculated by comparing the arithmetic mean of the TRPH concentrations observed on Day 45 and 56 to the baseline (Day 0) TRPH concentrations. Based on the laboratory results, the calculated half-life of the petroleum hydrocarbons as oil and grease in the soil composites are approximately 92, 35, 80, 135, and 63 days for 100 percent mud, 100 percent sand, 50 percent mud to 50 percent sand, 75 percent mud to 25 percent sand, and 75 percent sand to 25 percent mud, respectively. Assuming an average TRPH concentration of 3,000 parts per million (ppm) in the soil and linear microbial degradation rate over the concentration range, the estimated treatment time required to reduce TRPH concentrations to less than 100 mg/kg would be as short as 175 days to as long as 674 days. The full-scale treatment time is anticipated to be within ± 30 percent of the laboratory study.

Based on the results of the biological treatment simulation, it appears that an increase in the percentage of sand in the treatment system will result in a reduction in the half-life for TRPH, thus, a shorter treatment period. For example, if the biological treatment mix is 50 percent mud to 50 percent sand, the overall treatment period can be reduced 60 days compared to a mix of 100 percent mud.

SUMMARY AND CONCLUSIONS

The results of the laboratory evaluation study performed by HLA indicates that mechanical aeration and nutrient addition to stimulate biological treatment is technically feasible and effective for reducing petroleum hydrocarbon concentrations in soil at the Texaco-Walker Property Site. A summary of the laboratory evaluation results are presented below.

- The microbial evaluation indicates that the existing microbial population in the soil contains a subpopulation of hydrocarbon-utilizing microorganisms and this subpopulation is within a range acceptable for biological degradation
- The soil inorganic chemistry evaluation indicates that low concentrations of the inorganic nutrient nitrogen could be limiting the metabolism of the existing microorganisms capable of degrading hydrocarbons in the soil environment. The addition of the limiting nutrients in

conjunction with oxygen should stimulate the growth of hydrocarbon-utilizing microorganisms, resulting in a reduction in soil TRPH concentration.

- The biological treatment simulation indicates that the addition of mechanical aeration and nutrients to soil composites of varying mud to sand ratios enhanced the growth of the existing hydrocarbon-utilizing microbial population, producing a maximum decrease of 64 percent in concentrations of TRPH as oil and grease during the 56-day treatment period.
- The biological treatment simulation indicates that an increase in the percentage of sand in the soil composites has the potential to result in a subsequent decrease in the half-life of TRPH.

Additionally, during the microbial enhancement operations, site soil moisture should be maintained in a range between 6 to 15 percent by weight. Meteorological conditions prevalent during the operational period are assumed to be insufficient to maintain adequate soil moisture; therefore, weekly field measurements of soil moisture should be performed and appropriate actions taken to maintain proper soil moisture. Effective microbial enhancement also requires that the soil pH be maintained between 6.5 to 8.5. Weekly field measurements for soil pH should be performed and, if necessary, appropriate corrective measures taken to maintain the required soil pH range. Treatment operations should be performed during late spring, summer, and early autumn seasons in which the ambient temperature range is conducive for microbial growth.

TABLES

**Table 1. Enumeration of Total and Hydrocarbon Utilizing Microorganisms in Soil
Texaco-Walker Property
Santa Fe Springs, California**

Sample Designation	HLA Lab No.	Sample Type	Total Microorganisms (cfu/gram*)	Hydrocarbon-Utilizing Microorganisms (cfu/gram*)	(percent of total)
LS-9 @ 9.5 feet	94-5113	Soil	3.0×10^2	1.1×10^2	(37)
LS-9 @ 19.5 feet	94-5114	Soil	1.9×10^3	1.7×10^2	(8.9)
LS-10 @ 0.5 feet	94-5115	Soil	1.7×10^6	3.3×10^4	(1.9)
LS-10 @ 5.5 feet	94-5116	Soil	3.7×10^5	2.6×10^4	(7.0)
RS-12 @ 1.5 feet	94-5105	Soil	1.7×10^6	1.3×10^4	(0.76)
RS-12 @ 5.5 feet	94-5106	Soil	1.4×10^6	1.7×10^4	(1.2)
RS-13 @ 10.0 feet	94-5107	Soil	2.3×10^5	1.3×10^4	(5.7)
RS-13 @ 15.0 feet	94-5108	Soil	3.3×10^3	6.1×10^2	(18)
RS-14 @ 5.5 feet	94-5109	Soil	1.3×10^6	1.7×10^4	(1.3)
RS-14 @ 35.5 feet	94-5110	Soil	1.7×10^4	6.1×10^2	(3.6)
RS-16 @ 15.5 feet	94-5111	Soil	6.7×10^4	4.9×10^3	(7.3)
RS-16 @ 25.5 feet	94-5112	Soil	3.7×10^4	1.7×10^3	(4.6)

*Colony forming units per gram.

Table 2. Soil Chemistry Profile
Texaco-Walker Property
Santa Fe Springs, California

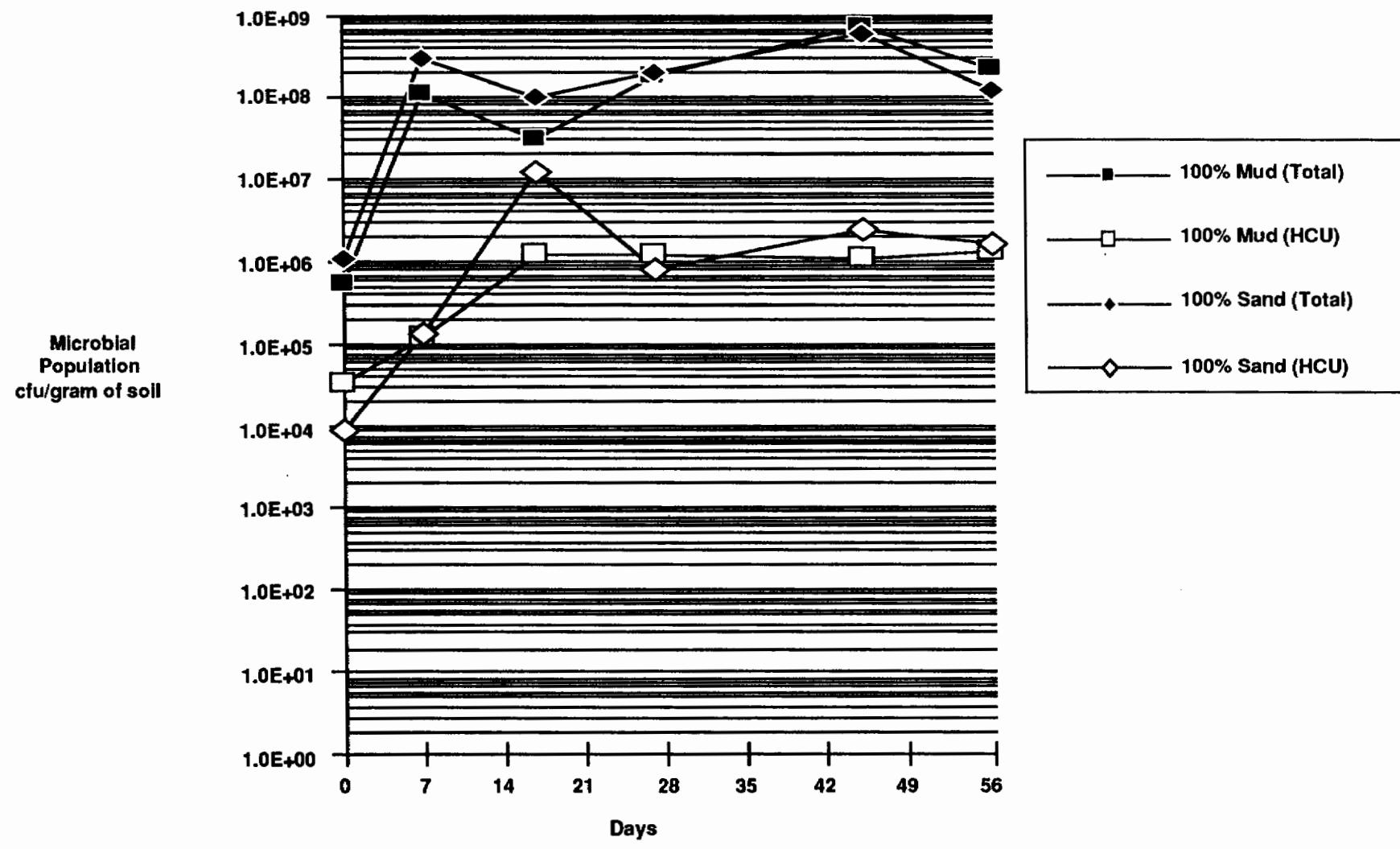
Parameter	Sample Designation ⁽¹⁾	
	Mud Composite	Sand Composite
Parameter	94-1263	94-1264
pH	7.5	7.3
Ammonia-N (mg/kg) ⁽²⁾	0.3	0.2
Nitrate-N (mg/kg)	8.0	9.0
Orthophosphate (mg/kg)	19.2	18.2
Sulfate (mg/kg)	320	270
Water Soluble Iron (mg/kg)	16.6	31.2
Water Soluble Manganese (mg/kg)	1.3	1.3
Water Soluble Magnesium (mg/kg)	40.8	19.4
Water Soluble Potassium (mg/kg)	10.8	10.0
Water Soluble Calcium (mg/kg)	214.4	158.4
Cation Exchange Capacity (meq ⁽³⁾ /100 gm)	19.4	12.0

(1) Samples taken by HLA on May 26, 1994, and analyzed by ETS Laboratories.

(2) Milligram per kilogram - equivalent to parts per million.

(3) Milliequivalent per 100 grams.

PLATES



Harding Lawson Associates
Engineering and
Environmental Services

DRAWN
EFH

JOB NUMBER
24246-2.3

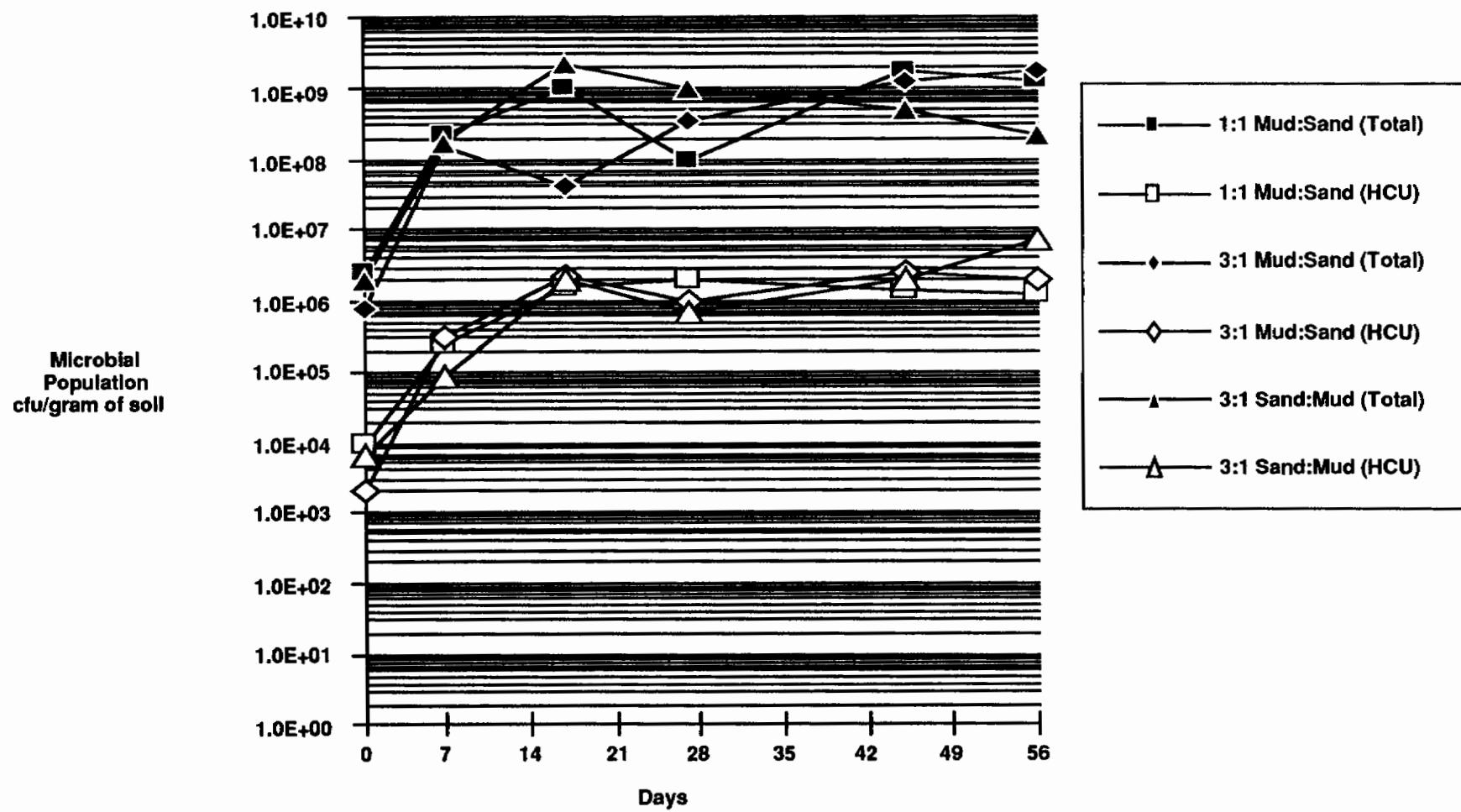
Microbial Populations
Laboratory Simulation System
Texaco - Walker Property
Santa Fe Springs, California

APPROVED
[Signature]

DATE
8/94

REVISED DATE

PLATE
1



Harding Lawson Associates
Engineering and
Environmental Services

DRAWN
EFH

JOB NUMBER
24246-2.3

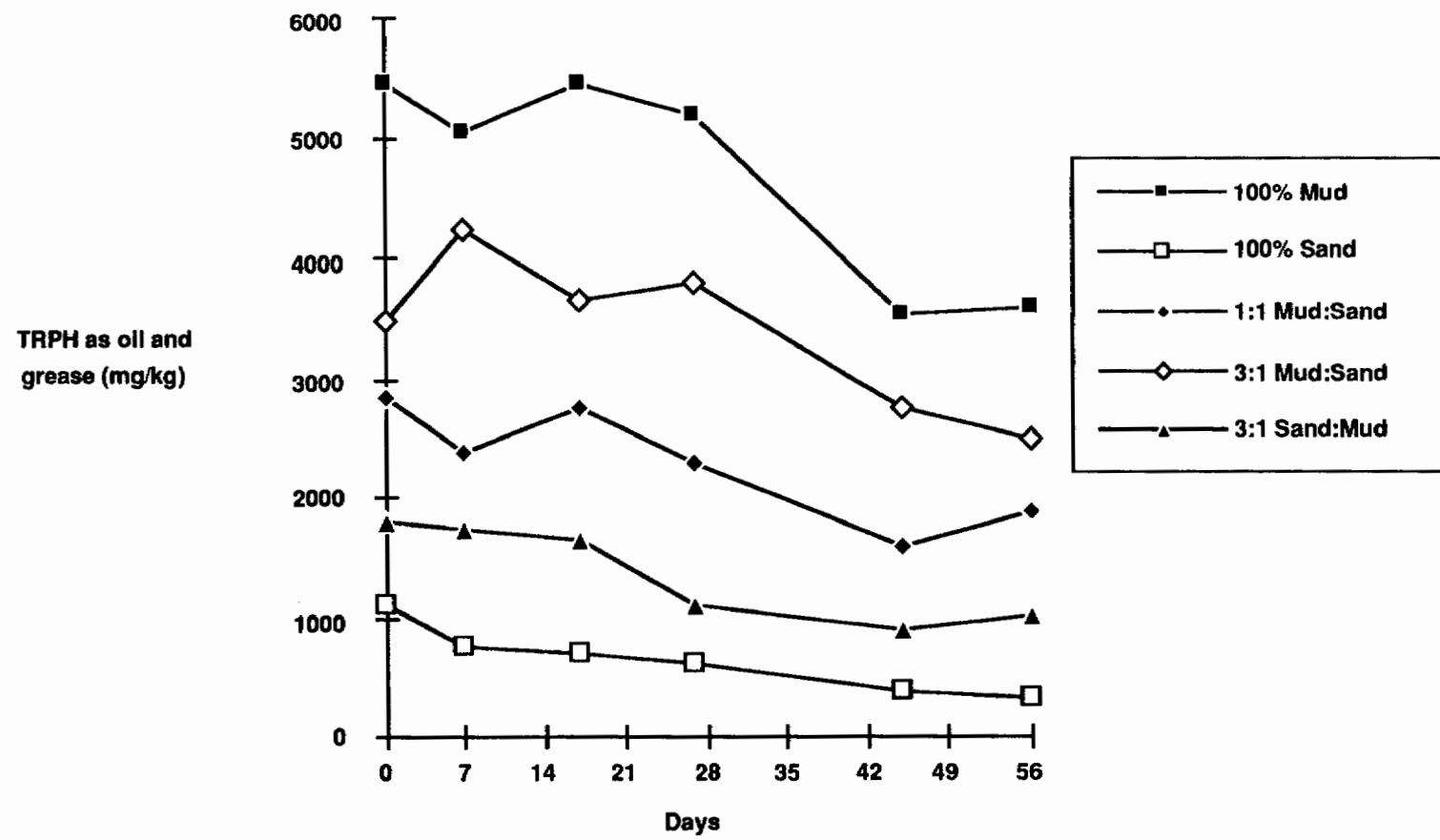
Microbial Populations
Laboratory Simulation System
Texaco - Walker Property
Santa Fe Springs, California

APPROVED
TPS

PLATE
2

DATE
8/94

REVISED DATE



**Harding Lawson Associates
Engineering and
Environmental Services**

DRAWN
EFH

JOB NUMBER
24246-2.3

**TRPH Concentrations Versus Time
Laboratory Simulation System
Texaco - Walker Property
Santa Fe Springs, California**

APPROVED
DLB

DATE
8/94

REVISED DATE

PLATE
3

APPENDIX F

APPENDIX F
GROUNDWATER ANALYTICAL RESULTS

December 5, 1993

BCA

B C Analytical

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707

Dear Ms. Martinez:

Enclosed please find the analytical report and batch QC report for BC Analytical Order G93-09-178, for samples received by the laboratory on September 15, 1993.

<u>Sample ID</u>	<u>BCA ID</u>	<u>Dt Spld</u>	<u>Analyses Requested</u>
HLA-1	G93-09-178-1	09/14/93	Volatile Organics, TRPH/418.1, TPH/8015M, General Minerals
H - 7	G93-09-178-2	09/14/93	Volatile Organics, TRPH/418.1, TPH/8015M
W - 1	G93-09-178-3	09/14/93	Volatile Organics, TRPH/418.1, TPH/8015M, General Minerals
W - 2	G93-09-178-4	09/14/93	Volatile Organics, TRPH/418.1, TPH/8015M, General Minerals
W - 3	G93-09-178-5	09/14/93	Volatile Organics, TRPH/418.1, TPH/8015M, General Minerals
W - 4	G93-09-178-6	09/14/93	Volatile Organics, TRPH/418.1, TPH/8015M, General Minerals
W - 5	G93-09-178-7	09/14/93	Volatile Organics, TRPH/418.1, TPH/8015M, General Minerals
EW - 1	G93-09-178-8	09/14/93	Volatile Organics, TRPH/418.1, TPH/8015M, General Minerals

Harding Lawson Associates
Page Two

Trip Blank G93-09-178-9 09/14/93 Volatile Organics

Volatile Organics

Samples were analyzed according to EPA method 8260 for volatile organics. All samples were analyzed within EPA specified holding times.

Petroleum/Fuels

Samples were analyzed in accordance with EPA method 418.1. All samples were analyzed within EPA specified holding times.

Samples were analyzed in accordance with EPA method 8015, modified for gasoline and diesel. All samples were analyzed within EPA specified holding times.

Two laboratory control standards were used for validation of batch FUEL*93111 in lieu of matrix QC.

General Mineral

Samples were analyzed for General Mineral parameters within method specified holding times.

The matrix spike and duplicate for batch 6010*931304 for analysis of Iron, Manganese, and Sodium were flagged as "NC". This is due to the relatively high concentration of the spiked sample.

The matrix spike and duplicate for batch CL*9393 for analysis for chloride was flagged as "NC". This was due to the relatively high concentration of the spiked sample.

If you have any questions, or if I can be of further assistance, please call me at 818/247-5737.

Very truly yours,


Carol S. McHale
Client Services Representative

:CSM

Analytical Report

ANALYTICAL REPORT

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-1	HLA-1	14 SEP 93
PARAMETER	09-178-1	
Alkalinity (310.1)		
Carbonate Alk (as CaCO ₃), mg/L	<1	
Bicarbonate Alk (as CaCO ₃), mg/L	1300	
Hydroxide Alk (as CaCO ₃), mg/L	<1	
Total Alkalinity (as CaCO ₃), mg/L	1300	
Calcium (6010), mg/L	79	
Magnesium (6010), mg/L	24	
Chloride (325.3), mg/L	170	
Copper (6010), mg/L	<0.02	
Surfactants, MBAS (425.1), mg/L	0.58	
Iron (6010), mg/L	1.4	
Manganese (6010), mg/L	0.46	
pH (150.1/9040), Units	7.2	
Potassium (6010), mg/L	5.9	
Sodium (6010)		
Sodium (6010), mg/L	720	
Sulfate (375.4), mg/L	230	
Conductivity (120.1), umhos/cm	3100	
Filterable Residue, TDS (160.1), mg/L	1900	
Zinc (6010), mg/L	0.19	
Ion Balance, Percent	1.9	
Nitrate (353.2)		
Nitrate (as N), mg/L	<0.05	
Nitrate (as NO ₃), mg/L	<0.2	
Digestion (3010), Date	09/16/93	
Aluminum (6010), mg/L	<0.1	
Fluoride (340.2), mg/L	0.17	
TRPH/CADHS/418.1, mg/kg	<0.5	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-1	HLA-1	14 SEP 93
PARAMETER	09-178-1	
TPH-diesel/CADHS		
Date Analyzed	09/23/93	
Date Extracted	09/21/93	
Dilution Factor, Times 1	1	
TPH (total), mg/L	<1	
Other TPH-diesel/CADHS	---	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-1	HLA-1	14 SEP 93
PARAMETER		09-178-1
Vol.Pri.Pol. (EPA 8260)		
Date Analyzed		09/17/93
Dilution Factor, Times		1
1,1,1-Trichloroethane, ug/L		<1
1,1,2,2-Tetrachloroethane, ug/L		<1
1,1,2-Trichloroethane, ug/L		<1
1,1-Dichloroethane, ug/L		<1
1,1-Dichloroethene, ug/L		<1
1,2-Dichloroethane, ug/L		<1
1,2-Dichlorobenzene, ug/L		<1
1,2-Dichloropropane, ug/L		<1
1,3-Dichlorobenzene, ug/L		<1
1,4-Dichlorobenzene, ug/L		<1
2-Chloroethylvinylether, ug/L		<1
2-Hexanone, ug/L		<5
Acetone, ug/L		<20
Acrolein, ug/L		<50
Acrylonitrile, ug/L		<50
Bromodichloromethane, ug/L		<1
Bromomethane, ug/L		<1
Benzene, ug/L		<1
Bromoform, ug/L		<1
Chlorobenzene, ug/L		<1
Carbon Tetrachloride, ug/L		<1
Chloroethane, ug/L		<1
Chloroform, ug/L		<1
Chloromethane, ug/L		<1

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-1	HLA-1	14 SEP 93
PARAMETER		09-178-1
Carbon Disulfide, ug/L	<2	
Dibromochloromethane, ug/L	<1	
Ethylbenzene, ug/L	<1	
Freon 113, ug/L	<2	
Methyl ethyl ketone, ug/L	<5	
Methyl isobutyl ketone, ug/L	<5	
Methylene chloride, ug/L	<1	
Styrene, ug/L	<1	
Trichloroethene, ug/L	<1	
Trichlorofluoromethane, ug/L	<1	
Toluene, ug/L	<1	
Tetrachloroethene, ug/L	<1	
Vinyl acetate, ug/L	<10	
Vinyl chloride, ug/L	<1	
Total Xylene Isomers, ug/L	<3	
cis-1,2-Dichloroethene, ug/L	<1	
cis-1,3-Dichloropropene, ug/L	<1	
trans-1,2-Dichloroethene, ug/L	<1	
trans-1,3-Dichloropropene, ug/L	<1	
Other Vol.Pri.Pol. (EPA 8260)	---	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 5

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-2	H-7	14 SEP 93
PARAMETER		09-178-2
TRPH/CADHS/418.1, mg/kg	<0.5	
TPH-diesel/CADHS		
Date Analyzed	09/23/93	
Date Extracted	09/21/93	
Dilution Factor, Times 1	1	
TPH (total), mg/L	<1	
Other TPH-diesel/CADHS	---	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 6

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-2	H-7	14 SEP 93
PARAMETER	09-178-2	
Vol.Pri.Pol. (EPA 8260)		
Date Analyzed	09/17/93	
Dilution Factor, Times	1	
1,1,1-Trichloroethane, ug/L	<1	
1,1,2,2-Tetrachloroethane, ug/L	<1	
1,1,2-Trichloroethane, ug/L	<1	
1,1-Dichloroethane, ug/L	<1	
1,1-Dichloroethene, ug/L	<1	
1,2-Dichloroethane, ug/L	<1	
1,2-Dichlorobenzene, ug/L	<1	
1,2-Dichloropropane, ug/L	<1	
1,3-Dichlorobenzene, ug/L	<1	
1,4-Dichlorobenzene, ug/L	<1	
2-Chloroethylvinylether, ug/L	<1	
2-Hexanone, ug/L	<5	
Acetone, ug/L	<20	
Acrolein, ug/L	<50	
Acrylonitrile, ug/L	<50	
Bromodichloromethane, ug/L	<1	
Bromomethane, ug/L	<1	
Benzene, ug/L	<1	
Bromoform, ug/L	<1	
Chlorobenzene, ug/L	<1	
Carbon Tetrachloride, ug/L	<1	
Chloroethane, ug/L	<1	
Chloroform, ug/L	<1	
Chloromethane, ug/L	<1	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 7

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-2	H-7	14 SEP 93
PARAMETER	09-178-2	
Carbon Disulfide, ug/L	<2	
Dibromochloromethane, ug/L	<1	
Ethylbenzene, ug/L	<1	
Freon 113, ug/L	<2	
Methyl ethyl ketone, ug/L	<5	
Methyl isobutyl ketone, ug/L	<5	
Methylene chloride, ug/L	<1	
Styrene, ug/L	<1	
Trichloroethene, ug/L	<1	
Trichlorofluoromethane, ug/L	<1	
Toluene, ug/L	<1	
Tetrachloroethene, ug/L	<1	
Vinyl acetate, ug/L	<10	
Vinyl chloride, ug/L	<1	
Total Xylene Isomers, ug/L	<3	
cis-1,2-Dichloroethene, ug/L	<1	
cis-1,3-Dichloropropene, ug/L	<1	
trans-1,2-Dichloroethene, ug/L	<1	
trans-1,3-Dichloropropene, ug/L	<1	
Other Vol.Pri.Pol. (EPA 8260)	---	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 8

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER	09-178-3	09-178-4	09-178-5	09-178-6	09-178-7	
Alkalinity (310.1)						
Carbonate Alk (as CaCO ₃), mg/L	<1	<1	<1	<1	<1	<1
Bicarbonate Alk (as CaCO ₃), mg/L	570	620	800	770	800	
Hydroxide Alk (as CaCO ₃), mg/L	<1	<1	<1	<1	<1	<1
Total Alkalinity (as CaCO ₃), mg/L	570	620	800	770	800	
Calcium (6010), mg/L	210	220	250	140	140	
Magnesium (6010), mg/L	83	98	86	56	56	
Chloride (325.3), mg/L	820	1100	850	370	370	
Copper (6010), mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Surfactants, MBAS (425.1), mg/L	0.30	0.36	0.47	0.39	0.30	
Iron (6010), mg/L	3.0	<0.04	5.4	1.1	1.5	
Manganese (6010), mg/L	0.29	<0.01	0.61	0.31	0.32	
pH (150.1/9040), Units	7.0	7.0	7.1	7.2	7.2	
Potassium (6010), mg/L	8.7	9.8	10	7.6	7.6	
Sodium (6010), mg/L	390	520	470	370	370	
Sulfate (375.4), mg/L	2.6	2.9	4.4	6.4	6.7	
Conductivity (120.1), umhos/cm	3300	4300	3700	2600	2400	
Filterable Residue, TDS (160.1), mg/L	1800	2300	2000	1500	1300	
Zinc (6010), mg/L	0.057	<0.01	1.1	0.87	0.81	
Ion Balance, Percent	0.11	0.88	0.98	4.9	3.0	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 9

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER	09-178-3	09-178-4	09-178-5	09-178-6	09-178-7	
Nitrate (353.2)						
Nitrate (as N), mg/L	<0.05	<0.05	0.14	0.084	0.051	
Nitrate (as NO ₃), mg/L	<0.2	<0.2	0.63	0.37	0.23	
Digestion (3010), Date	09/16/93	09/16/93	09/16/93	09/16/93	09/16/93	
Aluminum (6010), mg/L	1.2	<0.1	<0.1	<0.1	0.10	
Fluoride (340.2), mg/L	0.081	0.084	0.10	0.10	0.11	
TRPH/CADHS/418.1, mg/kg	<0.5	0.80	0.70	0.50	<0.5	
TPH-diesel/CADHS						
Date Analyzed	09/23/93	09/23/93	09/23/93	09/23/93	09/23/93	
Date Extracted	09/21/93	09/21/93	09/21/93	09/21/93	09/21/93	
Dilution Factor, Times 1	1	1	1	1	1	
TPH (total), mg/L	<1	<1	<1	<1	<1	
Other TPH-diesel/CADHS	---	---	---	---	---	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 10

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER	09-178-3	09-178-4	09-178-5	09-178-6	09-178-7	
Vol.Pri.Pol. (EPA 8260)						
Date Analyzed	09/22/93	09/21/93	09/17/93	09/17/93	09/17/93	
Dilution Factor, Times	5	1	1	1	1	
1,1,1-Trichloroethane, ug/L	<5	<1	<1	<1	<1	
1,1,2,2-Tetrachloroethane, ug/L	<5	<1	<1	<1	<1	
1,1,2-Trichloroethane, ug/L	<5	<1	<1	<1	<1	
1,1-Dichloroethane, ug/L	<5	<1	<1	3.9	3.6	
1,1-Dichloroethene, ug/L	<5	<1	<1	<1	<1	
1,2-Dichloroethane, ug/L	<5	<1	<1	<1	<1	
1,2-Dichlorobenzene, ug/L	<5	<1	<1	<1	<1	
1,2-Dichloropropane, ug/L	<5	<1	<1	<1	<1	
1,3-Dichlorobenzene, ug/L	<5	<1	<1	<1	<1	
1,4-Dichlorobenzene, ug/L	<5	<1	1.3	1.5	1.7	
2-Chloroethylvinylether, ug/L	<5	<1	<1	<1	<1	
2-Hexanone, ug/L	<30	<5	<5	<5	<5	
Acetone, ug/L	100	<20	<20	<20	<20	
Acrolein, ug/L	<300	<50	<50	<50	<50	
Acrylonitrile, ug/L	<300	<50	<50	<50	<50	
Bromodichloromethane, ug/L	<5	<1	<1	<1	<1	
Bromomethane, ug/L	<5	<1	<1	<1	<1	
Benzene, ug/L	410	180	5.1	140	140	
Bromoform, ug/L	<5	<1	<1	<1	<1	
Chlorobenzene, ug/L	<5	<1	<1	<1	<1	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 11

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER	09-178-3	09-178-4	09-178-5	09-178-6	09-178-7	
Carbon Tetrachloride, ug/L	<5	<1	<1	<1	<1	<1
Chloroethane, ug/L	<5	<1	<1	<1	<1	<1
Chloroform, ug/L	<5	<1	<1	<1	<1	<1
Chloromethane, ug/L	<5	<1	<1	<1	<1	<1
Carbon Disulfide, ug/L	<10	<2	6.1	34	15	
Dibromochloromethane, ug/L	<5	<1	<1	<1	<1	
Ethylbenzene, ug/L	55	10	<1	1.4	1.3	
Freon 113, ug/L	<10	<2	<2	<2	<2	
Methyl ethyl ketone, ug/L	<30	<5	<5	<5	<5	
Methyl isobutyl ketone, ug/L	<30	<5	<5	<5	<5	
Methylene chloride, ug/L	<5	<1	<1	<1	<1	
Styrene, ug/L	<5	<1	<1	<1	<1	
Trichloroethene, ug/L	<5	<1	<1	<1	<1	
Trichlorofluoromethane, ug/L	<5	<1	<1	<1	<1	
Toluene, ug/L	<5	1.4	<1	<1	1.9	
Tetrachloroethene, ug/L	<5	<1	<1	<1	<1	
Vinyl acetate, ug/L	<50	<10	<10	<10	<10	
Vinyl chloride, ug/L	<5	<1	<1	<1	<1	
Total Xylene Isomers, ug/L	<20	<3	<3	3.3	<3	
cis-1,2-Dichloroethene, ug/L	51	100	5.8	8.6	7.9	
cis-1,3-Dichloropropene, ug/L	<5	<1	<1	<1	<1	
trans-1,2-Dichloroethene, ug/L	<5	18	<1	<1	<1	
trans-1,3-Dichloropropene, ug/L	<5	<1	<1	<1	<1	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 12

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER		09-178-3	09-178-4	09-178-5	09-178-6	09-178-7
Other Vol.Pri.Pol. (EPA 8260)	---	---	---	---	---	---
Semi-Quantified Results **						
C6 Cyclic Hydrocarbon, ug/L	500	---	---	---	---	---
C3 Alkylated Benzene, ug/L	50	---	---	---	---	---
C5 Cyclic Hydrocarbon, ug/L	---	---	---	10	10	
C5 Cyclic Alkylated Hydrocarbon, ug/L	---	---	10	---	---	
C5 Hydrocarbon, ug/L	---	---	---	10	60	
C6 Cyclic Hydrocarbon, ug/L	---	---	10	50	50	
C6 Cyclic Alkylated Hydrocarbon, ug/L	---	---	---	20	20	
C6 Hydrocarbon, ug/L	---	---	10	50	---	
C8 Hydrocarbon, ug/L	---	---	---	10	10	

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 13

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-8	EW-1	14 SEP 93
PARAMETER	09-178-8	
Alkalinity (310.1)		
Carbonate Alk (as CaCO ₃), mg/L	<1	
Bicarbonate Alk (as CaCO ₃), mg/L	700	
Hydroxide Alk (as CaCO ₃), mg/L	<1	
Total Alkalinity (as CaCO ₃), mg/L	700	
Calcium (6010), mg/L	150	
Magnesium (6010), mg/L	84	
Chloride (325.3), mg/L	590	
Copper (6010), mg/L	<0.02	
Surfactants, MBAS (425.1), mg/L	<0.1	
Iron (6010), mg/L	0.32	
Manganese (6010), mg/L	0.11	
pH (150.1/9040), Units	7.1	
Potassium (6010), mg/L	7.6	
Sodium (6010), mg/L	310	
Sulfate (375.4), mg/L	20	
Conductivity (120.1), umhos/cm	2600	
Filterable Residue, TDS (160.1), mg/L	1500	
Zinc (6010), mg/L	0.066	
Ion Balance, Percent	6.6	
Nitrate (353.2)		
Nitrate (as N), mg/L	<0.05	
Nitrate (as NO ₃), mg/L	<0.2	
Digestion (3010), Date	09/16/93	
Aluminum (6010), mg/L	0.14	
Fluoride (340.2), mg/L	0.13	
TRPH/CADHS/418.1, mg/kg	73	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 14

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-8	EW-1	14 SEP 93
PARAMETER		09-178-8
TPH-diesel/CADHS		
Date Analyzed		09/23/93
Date Extracted		09/21/93
Dilution Factor, Times 1		1
Carbon Range, .		C7-C18
TPH (total), mg/L		7.8
Fuel Character, .		Unknown

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 15

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-8	EW-1	14 SEP 93
PARAMETER	09-178-8	
Vol.Pri.Pol. (EPA 8260)		
Date Analyzed	09/21/93	
Dilution Factor, Times	5	
1,1,1-Trichloroethane, ug/L	<5	
1,1,2,2-Tetrachloroethane, ug/L	<5	
1,1,2-Trichloroethane, ug/L	<5	
1,1-Dichloroethane, ug/L	<5	
1,1-Dichloroethene, ug/L	<5	
1,2-Dichloroethane, ug/L	<5	
1,2-Dichlorobenzene, ug/L	<5	
1,2-Dichloropropane, ug/L	<5	
1,3-Dichlorobenzene, ug/L	<5	
1,4-Dichlorobenzene, ug/L	<5	
2-Chloroethylvinylether, ug/L	<5	
2-Hexanone, ug/L	<30	
Acetone, ug/L	180	
Acrolein, ug/L	<300	
Acrylonitrile, ug/L	<300	
Bromodichloromethane, ug/L	<5	
Bromomethane, ug/L	<5	
Benzene, ug/L	190	
Bromoform, ug/L	<5	
Chlorobenzene, ug/L	<5	
Carbon Tetrachloride, ug/L	<5	
Chloroethane, ug/L	<5	
Chloroform, ug/L	<5	
Chloromethane, ug/L	<5	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 16

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-8	EW-1	14 SEP 93
PARAMETER		09-178-8
Carbon Disulfide, ug/L		<10
Dibromochloromethane, ug/L		<5
Ethylbenzene, ug/L		260
Freon 113, ug/L		<10
Methyl ethyl ketone, ug/L		<30
Methyl isobutyl ketone, ug/L		<30
Methylene chloride, ug/L		<5
Styrene, ug/L		<5
Trichloroethene, ug/L		<5
Trichlorofluoromethane, ug/L		<5
Toluene, ug/L		<5
Tetrachloroethene, ug/L		<5
Vinyl acetate, ug/L		<50
Vinyl chloride, ug/L		<5
Total Xylene Isomers, ug/L		60
cis-1,2-Dichloroethene, ug/L		28
cis-1,3-Dichloropropene, ug/L		<5
trans-1,2-Dichloroethene, ug/L		31
trans-1,3-Dichloropropene, ug/L		<5
Other Vol.Pri.Pol. (EPA 8260)		---
Semi-Quantified Results **		
A C10 Hydrocarbon, ug/L		500
C3 Alkylated Benzene, ug/L		800
C5 Hydrocarbon, ug/L		600
C6 Cyclic Hydrocarbon, ug/L		900
C7 Cyclic Hydrocarbon, ug/L		600

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 17

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-8	EW-1	14 SEP 93
PARAMETER	09-178-8	
C8 Cyclic Hydrocarbon, ug/L	500	
C9 Cyclic Hydrocarbon, ug/L	500	
C9 Hydrocarbon, ug/L	400	

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 18

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
09-178-9	Trip Blank #30907	14 SEP 93
PARAMETER	09-178-9	
Vol.Pri.Pol. (EPA 8260)		
Date Analyzed	09/21/93	
Dilution Factor, Times	1	
1,1,1-Trichloroethane, ug/L	<1	
1,1,2,2-Tetrachloroethane, ug/L	<1	
1,1,2-Trichloroethane, ug/L	<1	
1,1-Dichloroethane, ug/L	<1	
1,1-Dichloroethene, ug/L	<1	
1,2-Dichloroethane, ug/L	<1	
1,2-Dichlorobenzene, ug/L	<1	
1,2-Dichloropropane, ug/L	<1	
1,3-Dichlorobenzene, ug/L	<1	
1,4-Dichlorobenzene, ug/L	<1	
2-Chloroethylvinylether, ug/L	<1	
2-Hexanone, ug/L	<5	
Acetone, ug/L	<20	
Acrolein, ug/L	<50	
Acrylonitrile, ug/L	<50	
Bromodichloromethane, ug/L	<1	
Bromomethane, ug/L	<1	
Benzene, ug/L	<1	
Bromoform, ug/L	<1	
Chlorobenzene, ug/L	<1	
Carbon Tetrachloride, ug/L	<1	
Chloroethane, ug/L	<1	
Chloroform, ug/L	<1	
Chloromethane, ug/L	<1	

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

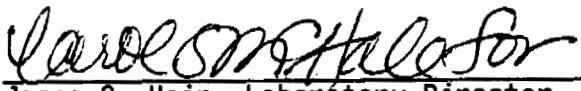
Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Page 19

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
09-178-9	Trip Blank #30907	14 SEP 93
PARAMETER	09-178-9	
Carbon Disulfide, ug/L	<2	
Dibromochloromethane, ug/L	<1	
Ethylbenzene, ug/L	<1	
Freon 113, ug/L	<2	
Methyl ethyl ketone, ug/L	<5	
Methyl isobutyl ketone, ug/L	<5	
Methylene chloride, ug/L	<1	
Styrene, ug/L	<1	
Trichloroethene, ug/L	<1	
Trichlorofluoromethane, ug/L	<1	
Toluene, ug/L	<1	
Tetrachloroethene, ug/L	<1	
Vinyl acetate, ug/L	<10	
Vinyl chloride, ug/L	<1	
Total Xylene Isomers, ug/L	<3	
cis-1,2-Dichloroethene, ug/L	<1	
cis-1,3-Dichloropropene, ug/L	<1	
trans-1,2-Dichloroethene, ug/L	<1	
trans-1,3-Dichloropropene, ug/L	<1	
Other Vol.Pri.Pol. (EPA 8260)	---	


James C. Hein, Laboratory Director

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Log Number : 93-09-178-1
Sample Description: HLA-1

General Mineral Analysis
Sampled Date 14 SEP 93

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO ₃)	<0.2	<0.0032	Hydroxide Alk (as CaCO ₃)	<1
Chloride (325.3)	170	4.8	Carbonate Alk (as CaCO ₃)	<1
Sulfate (375.4)	230	4.8	Bicarbonate Alk (as CaCO ₃)	1300
Bicarbonate (as HC ₀₃)	1600	26	Ca Hardness (as CaCO ₃)	20
Carbonate (as CO ₃)	<0.6	<0.02	Mg Hardness (as CaCO ₃)	99
Hydroxide (as OH)	<0.34	<0.02	Total Hardness	299
Total Millequivalents per Liter		35.6	Iron (6010)	1.4
Cations	mg/L	meq/L	Manganese (6010)	0.46
Magnesium (6010)	24	2	Copper (6010)	<0.02
Sodium (6010)	720	31	Zinc (6010)	0.19
Potassium (6010)	5.9	0.15	Surfactants, MBAS (425.1)	0.58
Calcium (6010)	79	3.9	Filterable Residue, TDS (1900
Total Millequivalents per Liter		37.1	Sp. Conductance, umhos/cm	3100
			pH (150.1/9040), units	7.2
			Ion balance in percent	1.93

* Conforms to Title 22, California Administrative Code

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Log Number : 93-09-178-3
Sample Description: W-1

General Mineral Analysis
Sampled Date 14 SEP 93

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as N03)	<0.2	<0.0032	Hydroxide Alk (as CaCO3)	<1
Chloride (325.3)	820	23	Carbonate Alk (as CaCO3)	<1
Sulfate (375.4)	2.6	0.054	Bicarbonate Alk (as CaCO3)	570
Bicarbonate (as HC03)	700	11	Ca Hardness (as CaCO3)	520
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	340
Hydroxide (as OH)	<0.34	<0.02	Total Hardness	860
Total Millequivalents per Liter		34.1	Iron (6010)	3.0
Cations	mg/L	meq/L	Manganese (6010)	0.29
Magnesium (6010)	83	6.8	Copper (6010)	<0.02
Sodium (6010)	390	17	Zinc (6010)	0.057
Potassium (6010)	8.7	0.22	Surfactants, MBAS (425.1)	0.30
Calcium (6010)	210	10	Filterable Residue, TDS (1800
Total Millequivalents per Liter		34.0	Sp. Conductance, umhos/cm	3300
			pH (150.1/9040), units	7.0
			Ion balance in percent	0.11

* Conforms to Title 22, California Administrative Code

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Log Number : 93-09-178-4
Sample Description: W-2

General Mineral Analysis
Sampled Date 14 SEP 93

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as N03)	<0.2	<0.0032	Hydroxide Alk (as CaCO3)	<1
Chloride (325.3)	1100	31	Carbonate Alk (as CaCO3)	<1
Sulfate (375.4)	2.9	0.06	Bicarbonate Alk (as CaCO3)	620
Bicarbonate (as HC03)	760	12	Ca Hardness (as CaCO3)	55
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	400
Hydroxide (as OH)	<0.34	<0.02	Total Hardness	950
Total Millequivalents per Liter		43.1	Iron (6010)	<0.04
Cations	mg/L	meq/L	Manganese (6010)	<0.01
Magnesium (6010)	98	8.1	Copper (6010)	<0.02
Sodium (6010)	520	23	Zinc (6010)	<0.01
Potassium (6010)	9.8	0.25	Surfactants, MBAS (425.1)	0.36
Calcium (6010)	220	11	Filterable Residue, TDS (2300
Total Millequivalents per Liter		42.4	Sp. Conductance, umhos/cm	4300
			pH (150.1/9040), units	7.0
			Ion balance in percent	0.88

* Conforms to Title 22, California Administrative Code

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Log Number : 93-09-178-5
Sample Description: W-3

General Mineral Analysis
Sampled Date 14 SEP 93

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as N0 ₃)	0.63	0.01	Hydroxide Alk (as CaCO ₃)	<1
Chloride (325.3)	850	24	Carbonate Alk (as CaCO ₃)	<1
Sulfate (375.4)	4.4	0.092	Bicarbonate Alk (as CaCO ₃)	800
Bicarbonate (as HC0 ₃)	980	16	Ca Hardness (as CaCO ₃)	620
Carbonate (as C0 ₃)	<0.6	<0.02	Mg Hardness (as CaCO ₃)	350
Hydroxide (as OH)	<0.34	<0.02	Total Hardness	970
Total Millequivalents per Liter		40.1	Iron (6010)	5.4
Cations	mg/L	meq/L	Manganese (6010)	0.61
Magnesium (6010)	86	7.1	Copper (6010)	<0.02
Sodium (6010)	470	20	Zinc (6010)	1.1
Potassium (6010)	10	0.26	Surfactants, MBAS (425.1)	0.47
Calcium (6010)	250	12	Filterable Residue, TDS (2000
Total Millequivalents per Liter		39.4	Sp. Conductance, umhos/cm	3700
			pH (150.1/9040), units	7.1
			Ion balance in percent	0.98

* Conforms to Title 22, California Administrative Code

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Log Number : 93-09-178-6

Sample Description: W-4

General Mineral Analysis
Sampled Date 14 SEP 93

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as N03)	0.37	0.006	Hydroxide Alk (as CaCO3)	<1
Chloride (325.3)	370	10	Carbonate Alk (as CaCO3)	<1
Sulfate (375.4)	6.4	0.13	Bicarbonate Alk (as CaCO3)	770
Bicarbonate (as HC03)	940	15	Ca Hardness (as CaCO3)	35
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	230
Hydroxide (as OH)	<0.34	<0.02	Total Hardness	580
Total Millequivalents per Liter		25.2	Iron (6010)	1.1
Cations	mg/L	meq/L	Manganese (6010)	0.31
Magnesium (6010)	56	4.6	Copper (6010)	<0.02
Sodium (6010)	370	16	Zinc (6010)	0.87
Potassium (6010)	7.6	0.19	Surfactants, MBAS (425.1)	0.39
Calcium (6010)	140	7	Filterable Residue, TDS (1500
Total Millequivalents per Liter		27.8	Sp. Conductance, umhos/cm	2600
			pH (150.1/9040), units	7.2
			Ion balance in percent	4.93

* Conforms to Title 22, California Administrative Code

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Log Number : 93-09-178-7
Sample Description: W-5

General Mineral Analysis
Sampled Date 14 SEP 93

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as N03)	0.23	0.0037	Hydroxide Alk (as CaCO3)	<1
Chloride (325.3)	370	10	Carbonate Alk (as CaCO3)	<1
Sulfate (375.4)	6.7	0.14	Bicarbonate Alk (as CaCO3)	800
Bicarbonate (as HC03)	980	16	Ca Hardness (as CaCO3)	350
Carbonate (as C03)	<0.6	<0.02	Mg Hardness (as CaCO3)	230
Hydroxide (as OH)	<0.34	<0.02	Total Hardness	580
Total Millequivalents per Liter		26.2	Iron (6010)	1.5
Cations	mg/L	meq/L	Manganese (6010)	0.32
Magnesium (6010)	56	4.6	Copper (6010)	<0.02
Sodium (6010)	370	16	Zinc (6010)	0.81
Potassium (6010)	7.6	0.19	Surfactants, MBAS (425.1)	0.30
Calcium (6010)	140	7	Filterable Residue, TDS (1300
Total Millequivalents per Liter		27.8	Sp. Conductance, umhos/cm	2400
			pH (150.1/9040), units	7.2
			Ion balance in percent	2.97

* Conforms to Title 22, California Administrative Code

Analytical Report

LOG NO: G93-09-178

Received: 15 SEP 93
Mailed : 04 OCT 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: FCLB-149

REPORT OF ANALYTICAL RESULTS

Log Number : 93-09-178-8
Sample Description: EW-1

General Mineral Analysis
Sampled Date 14 SEP 93

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO ₃)	<0.2	<0.0032	Hydroxide Alk (as CaCO ₃)	<1
Chloride (325.3)	590	17	Carbonate Alk (as CaCO ₃)	<1
Sulfate (375.4)	20	0.42	Bicarbonate Alk (as CaCO ₃)	700
Bicarbonate (as HC0 ₃)	850	14	Ca Hardness (as CaCO ₃)	37
Carbonate (as CO ₃)	<0.6	<0.02	Mg Hardness (as CaCO ₃)	350
Hydroxide (as OH)	<0.34	<0.02		
Total Millequivalents per Liter		31.5	Total Hardness	720
Cations	mg/L	meq/L	Iron (6010)	0.32
Magnesium (6010)	84	6.9	Manganese (6010)	0.11
Sodium (6010)	310	13	Copper (6010)	<0.02
Potassium (6010)	7.6	0.19	Zinc (6010)	0.066
Calcium (6010)	150	7.5	Surfactants, MBAS (425.1)	<0.1
Total Millequivalents per Liter		27.6	Filterable Residue, TDS (1500
			Sp. Conductance, umhos/cm	2600
			pH (150.1/9040), units	7.1

* Conforms to Title 22, California Administrative Code

B C Analytical**ANALYTICAL REPORT**

801 Western Avenue
 Glendale, CA 91201
 818/247-5737
 Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Mailed: OCT 4 1993

Ms. Rachel Martinez
 Harding Lawson Associates
 3 Hutton Centre Drive, Suite 200
 Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER		09-178-1	09-178-2	09-178-3	09-178-4	09-178-5
Alkalinity (310.1)						
Carbonate Alk (as CaCO ₃), mg/L	<1	---	<1	<1	<1	<1
Bicarbonate Alk (as CaCO ₃), mg/L	1300	---	570	620	800	
Hydroxide Alk (as CaCO ₃), mg/L	<1	---	<1	<1	<1	<1
Total Alkalinity (as CaCO ₃), mg/L	1300	---	570	620	800	
Calcium (6010), mg/L	79	---	210	220	250	
Magnesium (6010), mg/L	24	---	83	98	86	
Chloride (325.3), mg/L	170	---	820	1100	850	
Copper (6010), mg/L	<0.02	---	<0.02	<0.02	<0.02	
Surfactants, MBAS (425.1), mg/L	0.58	---	0.30	0.36	0.47	
Iron (6010), mg/L	1.4	---	3.0	<0.04	5.4	
Manganese (6010), mg/L	0.46	---	0.29	<0.01	0.61	
pH (150.1/9040), Units	7.2	---	7.0	7.0	7.1	
Potassium (6010), mg/L	5.9	---	8.7	9.8	10	
Sodium (6010), mg/L	720	---	390	520	470	
Sulfate (375.4), mg/L	230	---	2.6	2.9	4.4	
Conductivity (120.1), umhos/cm	3100	---	3300	4300	3700	
Filterable Residue, TDS (160.1), mg/L	1900	---	1800	2300	2000	
Zinc (6010), mg/L	0.19	---	0.057	<0.01	1.1	
Ion Balance, Percent	1.9	---	0.11	0.88	0.98	

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
09-178-1	HLA-1					14 SEP 93
09-178-2	H-7					14 SEP 93
09-178-3	W-1					14 SEP 93
09-178-4	W-2					14 SEP 93
09-178-5	W-3					14 SEP 93
PARAMETER		09-178-1	09-178-2	09-178-3	09-178-4	09-178-5
Nitrate (353.2)						
Nitrate (as N), mg/L	<0.05	---	<0.05	<0.05	0.14	
Nitrate (as NO ₃), mg/L	<0.2	---	<0.2	<0.2	0.63	
Digestion (3010), Date	09/16/93	---	09/16/93	09/16/93	09/16/93	
Aluminum (6010), mg/L	<0.1	---	1.2	<0.1	<0.1	
Fluoride (340.2), mg/L	0.17	---	0.081	0.084	0.10	
TRPH/CADHS/418.1, mg/kg	<0.5	<0.5	<0.5	0.80	0.70	
TPH-diesel/CADHS						
Date Analyzed	09/23/93	09/23/93	09/23/93	09/23/93	09/23/93	
Date Extracted	09/21/93	09/21/93	09/21/93	09/21/93	09/21/93	
Dilution Factor, Times 1	1	1	1	1	1	
Petroleum Hydrocarbons, mg/L	<1	<1	<1	<1	<1	
Other TPH-diesel/CADHS	---	---	---	---	---	

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
09-178-1	HLA-1					14 SEP 93
09-178-2	H-7					14 SEP 93
09-178-3	W-1					14 SEP 93
09-178-4	W-2					14 SEP 93
09-178-5	W-3					14 SEP 93
PARAMETER		09-178-1	09-178-2	09-178-3	09-178-4	09-178-5
Vol.Pri.Pol. (EPA 8260)						
Date Analyzed	09/17/93	09/17/93	09/22/93	09/21/93	09/17/93	
Dilution Factor, Times	1	1	5	1	1	
1,1,1-Trichloroethane, ug/L	<1	<1	<5	<1	<1	
1,1,2,2-Tetrachloroethane, ug/L	<1	<1	<5	<1	<1	
1,1,2-Trichloroethane, ug/L	<1	<1	<5	<1	<1	
1,1-Dichloroethane, ug/L	<1	<1	<5	<1	<1	
1,1-Dichloroethene, ug/L	<1	<1	<5	<1	<1	
1,2-Dichloroethane, ug/L	<1	<1	<5	<1	<1	
1,2-Dichlorobenzene, ug/L	<1	<1	<5	<1	<1	
1,2-Dichloropropane, ug/L	<1	<1	<5	<1	<1	
1,3-Dichlorobenzene, ug/L	<1	<1	<5	<1	<1	
1,4-Dichlorobenzene, ug/L	<1	<1	<5	<1	1.3	
2-Chloroethylvinylether, ug/L	<1	<1	<5	<1	<1	
2-Hexanone, ug/L	<5	<5	<30	<5	<5	
Acetone, ug/L	<20	<20	100	66	<20	
Acrolein, ug/L	<50	<50	<300	<50	<50	
Acrylonitrile, ug/L	<50	<50	<300	<50	<50	
Bromodichloromethane, ug/L	<1	<1	<5	<1	<1	
Bromomethane, ug/L	<1	<1	<5	<1	<1	
Benzene, ug/L	<1	<1	410	180	5.1	
Bromoform, ug/L	<1	<1	<5	<1	<1	
Chlorobenzene, ug/L	<1	<1	<5	<1	<1	

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER	09-178-1	09-178-2	09-178-3	09-178-4	09-178-5	
Carbon Tetrachloride, ug/L	<1	<1	<5	<1	<1	
Chloroethane, ug/L	<1	<1	<5	<1	<1	
Chloroform, ug/L	<1	<1	<5	<1	<1	
Chloromethane, ug/L	<1	<1	<5	<1	<1	
Carbon Disulfide, ug/L	<2	<2	<10	<2	6.1	
Dibromochloromethane, ug/L	<1	<1	<5	<1	<1	
Ethylbenzene, ug/L	<1	<1	55	10	<1	
Freon 113, ug/L	<2	<2	<10	<2	<2	
Methyl ethyl ketone, ug/L	<5	<5	<30	<5	<5	
Methyl isobutyl ketone, ug/L	<5	<5	<30	<5	<5	
Methylene chloride, ug/L	<1	<1	<5	<1	<1	
Styrene, ug/L	<1	<1	<5	<1	<1	
Trichloroethene, ug/L	<1	<1	<5	<1	<1	
Trichlorofluoromethane, ug/L	<1	<1	<5	<1	<1	
Toluene, ug/L	<1	<1	<5	1.4	<1	
Tetrachloroethene, ug/L	<1	<1	<5	<1	<1	
Vinyl acetate, ug/L	<10	<10	<50	<10	<10	
Vinyl chloride, ug/L	<1	<1	<5	<1	<1	
Total Xylene Isomers, ug/L	<3	<3	<20	<3	<3	
cis-1,2-Dichloroethene, ug/L	<1	<1	51	100	5.8	
cis-1,3-Dichloropropene, ug/L	<1	<1	<5	<1	<1	
trans-1,2-Dichloroethene, ug/L	<1	<1	<5	18	<1	
trans-1,3-Dichloropropene, ug/L	<1	<1	<5	<1	<1	

B C Analytical

801 Western Avenue
Glendale, CA 91201
18/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 5

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-178-1	HLA-1	14 SEP 93
09-178-2	H-7	14 SEP 93
09-178-3	W-1	14 SEP 93
09-178-4	W-2	14 SEP 93
09-178-5	W-3	14 SEP 93

PARAMETER	09-178-1	09-178-2	09-178-3	09-178-4	09-178-5
Other Vol.Pri.Pol. (EPA 8260)	---	---	---	---	---

Semi-Quantified Results **

3 C6 Cyclic Hydrocarbon, ug/L	---	---	500	---	---
A C10 Hydrocarbon, ug/L	---	---	---	20	---
C3 Alkylated Benzene, ug/L	---	---	---	100	---
C3 Alkylated Benzene, ug/L	---	---	50	---	---
C4 Alkylated Benzene, ug/L	---	---	---	20	---
C5 Cyclic Alkylated Hydrocarbon, ug/L	---	---	---	---	10
C5 Hydrocarbon, ug/L	---	---	---	80	---
C6 Cyclic Hydrocarbon, ug/L	---	---	---	200	10
C6 Hydrocarbon, ug/L	---	---	---	20	10
C7 Cyclic Hydrocarbon, ug/L	---	---	---	40	---
C8 Cyclic Hydrocarbon, ug/L	---	---	---	30	---
C9 Hydrocarbon, ug/L	---	---	---	20	---

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 6

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		09-178-6	09-178-7	09-178-8
Alkalinity (310.1)				
Carbonate Alk (as CaCO ₃), mg/L		<1	<1	<1
Bicarbonate Alk (as CaCO ₃), mg/L		770	800	700
Hydroxide Alk (as CaCO ₃), mg/L		<1	<1	<1
Total Alkalinity (as CaCO ₃), mg/L		770	800	700
Calcium (6010), mg/L		140	140	150
Magnesium (6010), mg/L		56	56	84
Chloride (325.3), mg/L		370	370	590
Copper (6010), mg/L		<0.02	<0.02	<0.02
Surfactants, MBAS (425.1), mg/L		0.39	0.30	<0.1
Iron (6010), mg/L		1.1	1.5	0.32
Manganese (6010), mg/L		0.31	0.32	0.11
pH (150.1/9040), Units		7.2	7.2	7.1
Potassium (6010), mg/L		7.6	7.6	7.6
Sodium (6010), mg/L		370	370	310
Sulfate (375.4), mg/L		6.4	6.7	20
Conductivity (120.1), umhos/cm		2600	2400	2600
Filterable Residue, TDS (160.1), mg/L		1500	1300	1500
Zinc (6010), mg/L		0.87	0.81	0.066
Ion Balance, Percent		4.9	3.0	6.6

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 7

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		09-178-6	09-178-7	09-178-8
09-178-6	W-4			14 SEP 93
09-178-7	W-5			14 SEP 93
09-178-8	EW-1			14 SEP 93
Nitrate (353.2)				
Nitrate (as N), mg/L		0.084	0.051	<0.05
Nitrate (as NO ₃), mg/L		0.37	0.23	<0.2
Digestion (3010), Date		09/16/93	09/16/93	09/16/93
Aluminum (6010), mg/L		<0.1	0.10	0.14
Fluoride (340.2), mg/L		0.10	0.11	0.13
TRPH/CADHS/418.1, mg/kg		0.50	<0.5	73
TPH-diesel/CADHS				
Date Analyzed		09/23/93	09/23/93	09/23/93
Date Extracted		09/21/93	09/21/93	09/21/93
Dilution Factor, Times 1		1	1	1
Carbon Range, .		---	---	C7-C18
Petroleum Hydrocarbons, mg/L		<1	<1	7.8
Fuel Character, .		---	---	Unknown

B C Analytical

801 Western Avenue
 Glendale, CA 91201
 818/247-5737
 Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
 Harding Lawson Associates
 3 Hutton Centre Drive, Suite 200
 Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 8

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
09-178-6	W-4		14 SEP 93	
09-178-7	W-5		14 SEP 93	
09-178-8	EW-1		14 SEP 93	
PARAMETER		09-178-6	09-178-7	09-178-8
Vol.Pri.Pol. (EPA 8260)				
Date Analyzed		09/17/93	09/17/93	09/21/93
Dilution Factor, Times		1	1	5
1,1,1-Trichloroethane, ug/L		<1	<1	<5
1,1,2,2-Tetrachloroethane, ug/L		<1	<1	<5
1,1,2-Trichloroethane, ug/L		<1	<1	<5
1,1-Dichloroethane, ug/L		3.9	3.6	<5
1,1-Dichloroethene, ug/L		<1	<1	<5
1,2-Dichloroethane, ug/L		<1	<1	<5
1,2-Dichlorobenzene, ug/L		<1	<1	<5
1,2-Dichloropropane, ug/L		<1	<1	<5
1,3-Dichlorobenzene, ug/L		<1	<1	<5
1,4-Dichlorobenzene, ug/L		1.5	1.7	<5
2-Chloroethylvinylether, ug/L		<1	<1	<5
2-Hexanone, ug/L		<5	<5	<30
Acetone, ug/L		<20	<20	180
Acrolein, ug/L		<50	<50	<300
Acrylonitrile, ug/L		<50	<50	<300
Bromodichloromethane, ug/L		<1	<1	<5
Bromomethane, ug/L		<1	<1	<5
Benzene, ug/L		140	140	190
Bromoform, ug/L		<1	<1	<5
Chlorobenzene, ug/L		<1	<1	<5
Carbon Tetrachloride, ug/L		<1	<1	<5
Chloroethane, ug/L		<1	<1	<5

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 9

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		09-178-6	09-178-7	09-178-8
09-178-6	W-4			14 SEP 93
09-178-7	W-5			14 SEP 93
09-178-8	EW-1			14 SEP 93
Chloroform, ug/L		<1	<1	<5
Chloromethane, ug/L		<1	<1	<5
Carbon Disulfide, ug/L		34	15	<10
Dibromochloromethane, ug/L		<1	<1	<5
Ethylbenzene, ug/L		1.4	1.3	260
Freon 113, ug/L		<2	<2	<10
Methyl ethyl ketone, ug/L		<5	<5	<30
Methyl isobutyl ketone, ug/L		<5	<5	<30
Methylene chloride, ug/L		<1	<1	<5
Styrene, ug/L		<1	<1	<5
Trichloroethene, ug/L		<1	<1	<5
Trichlorofluoromethane, ug/L		<1	<1	<5
Toluene, ug/L		<1	1.9	<5
Tetrachloroethene, ug/L		<1	<1	<5
Vinyl acetate, ug/L		<10	<10	<50
Vinyl chloride, ug/L		<1	<1	<5
Total Xylene Isomers, ug/L		3.3	<3	60
cis-1,2-Dichloroethene, ug/L		8.6	7.9	28
cis-1,3-Dichloropropene, ug/L		<1	<1	<5
trans-1,2-Dichloroethene, ug/L		<1	<1	31
trans-1,3-Dichloropropene, ug/L		<1	<1	<5
Other Vol.Pri.Pol. (EPA 8260)		---	---	---
Semi-Quantified Results **				
A C10 Hydrocarbon, ug/L		---	---	500

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 10

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		09-178-6	09-178-7	09-178-8
09-178-6	W-4			14 SEP 93
09-178-7	W-5			14 SEP 93
09-178-8	EW-1			14 SEP 93
C3 Alkylated Benzene, ug/L		---	---	800
C5 Cyclic Hydrocarbon, ug/L		10	10	---
C5 Hydrocarbon, ug/L		10	60	600
C6 Cyclic Hydrocarbon, ug/L		50	50	900
C6 Cyclic Alkylated Hydrocarbon, ug/L		20	20	---
C6 Hydrocarbon, ug/L		50	---	---
C7 Cyclic Hydrocarbon, ug/L		---	---	600
C8 Cyclic Hydrocarbon, ug/L		---	---	500
C8 Hydrocarbon, ug/L		10	10	---
C9 Cyclic Hydrocarbon, ug/L		---	---	500
C9 Hydrocarbon, ug/L		---	---	400

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 11

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
09-178-9	Trip Blank #30907	14 SEP 93
PARAMETER	09-178-9	
Vol.Pri.Pol. (EPA 8260)		
Date Analyzed	09/21/93	
Dilution Factor, Times	1	
1,1,1-Trichloroethane, ug/L	<1	
1,1,2,2-Tetrachloroethane, ug/L	<1	
1,1,2-Trichloroethane, ug/L	<1	
1,1-Dichloroethane, ug/L	<1	
1,1-Dichloroethene, ug/L	<1	
1,2-Dichloroethane, ug/L	<1	
1,2-Dichlorobenzene, ug/L	<1	
1,2-Dichloropropane, ug/L	<1	
1,3-Dichlorobenzene, ug/L	<1	
1,4-Dichlorobenzene, ug/L	<1	
2-Chloroethylvinylether, ug/L	<1	
2-Hexanone, ug/L	<5	
Acetone, ug/L	<20	
Acrolein, ug/L	<50	
Acrylonitrile, ug/L	<50	
Bromodichloromethane, ug/L	<1	
Bromomethane, ug/L	<1	
Benzene, ug/L	<1	
Bromoform, ug/L	<1	
Chlorobenzene, ug/L	<1	
Carbon Tetrachloride, ug/L	<1	
Chloroethane, ug/L	<1	
Chloroform, ug/L	<1	
Chloromethane, ug/L	<1	

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-09-178

Received: 15 SEP 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246-2.3

REPORT OF ANALYTICAL RESULTS

Page 12

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
09-178-9	Trip Blank #30907	14 SEP 93
PARAMETER		09-178-9
Carbon Disulfide, ug/L	<2	
Dibromochloromethane, ug/L	<1	
Ethylbenzene, ug/L	<1	
Freon 113, ug/L	<2	
Methyl ethyl ketone, ug/L	<5	
Methyl isobutyl ketone, ug/L	<5	
Methylene chloride, ug/L	<1	
Styrene, ug/L	<1	
Trichloroethene, ug/L	<1	
Trichlorofluoromethane, ug/L	<1	
Toluene, ug/L	<1	
Tetrachloroethene, ug/L	<1	
Vinyl acetate, ug/L	<10	
Vinyl chloride, ug/L	<1	
Total Xylene Isomers, ug/L	<3	
cis-1,2-Dichloroethene, ug/L	<1	
cis-1,3-Dichloropropene, ug/L	<1	
trans-1,2-Dichloroethene, ug/L	<1	
trans-1,3-Dichloropropene, ug/L	<1	
Other Vol.Pri.Pol. (EPA 8260)	---	

Carole Smekha for -
James C. Hein, Laboratory Director

801 Western Avenue
 Glendale, CA 91201
 818/247-5737
 Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Mailed: DEC 16 1993

Ms. Rachel Martinez
 Harding Lawson Associates
 3 Hutton Centre Drive, Suite 200
 Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER		11-164-1	11-164-2	11-164-3	11-164-4	11-164-5
Alkalinity (310.1)						
Carbonate Alk (as CaCO ₃), mg/L	---	<1	<1	<1	<1	<1
Bicarbonate Alk (as CaCO ₃), mg/L	---	1300	340	730	740	
Hydroxide Alk (as CaCO ₃), mg/L	---	<1	<1	<1	<1	<1
Total Alkalinity (as CaCO ₃), mg/L	---	1300	340	730	740	
Calcium (6010), mg/L	---	53	55	210	180	
Magnesium (6010), mg/L	---	17	19	89	81	
Chloride (325.3), mg/L	---	240	140	710	570	
Copper (6010), mg/L	---	<0.02	<0.02	<0.02	<0.02	
Surfactants, MBAS (425.1), mg/L	---	0.50	0.61	0.27	0.27	
Iron (6010), mg/L	---	0.54	0.47	0.40	0.39	
Manganese (6010), mg/L	---	0.35	0.093	0.39	0.27	
pH (150.1/9040), Units	---	7.2	7.0	6.9	7.0	
Potassium (6010), mg/L	---	5.2	3.1	9.3	9.1	
Sodium (6010), mg/L	---	910	150	500	420	
Sulfate (375.4), mg/L	---	200	7.9	5.2	4	
Conductivity (120.1), umhos/cm	---	3400	1100	3600	3000	
Filterable Residue, TDS (160.1), mg/L	---	2300	620	2000	1700	
Zinc (6010), mg/L	---	0.027	1.6	0.027	0.037	
Ion Balance, Percent	---	8.73	0.11	5.87	4.30	

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-164-1	H - 7	09 NOV 93
11-164-2	HLA - 1	09 NOV 93
11-164-3	W - 3	09 NOV 93
11-164-4	W - 4	09 NOV 93
11-164-5	W - 1	09 NOV 93

PARAMETER	11-164-1	11-164-2	11-164-3	11-164-4	11-164-5
Nitrate (353.2)					
Nitrate (as N), mg/L	---	<0.05	<0.05	<0.05	<0.05
Nitrate (as NO ₃), mg/L	---	<0.2	<0.2	<0.2	<0.2
Digestion (3010), Date	---	11/18/93	11/18/93	11/18/93	11/18/93
Aluminum (6010), mg/L	---	<0.1	<0.1	0.13	<0.1
Fluoride (340.2), mg/L	---	0.22	0.087	0.094	0.13
TRPH/CADHS/418.1, mg/L	<0.5	0.7	0.8	2.6	4.5
TPH (8015M)					
Date Analyzed	11/16/93	11/16/93	11/16/93	11/16/93	11/16/93
Date Extracted	11/15/93	11/15/93	11/15/93	11/15/93	11/15/93
Dilution Factor, Times 1	1	1	1	1	1
TPH (diesel), mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
TPH (total), mg/L	<1	<1	<1	<1	<1
Other TPH (8015M)	---	---	---	---	---

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER		11-164-1	11-164-2	11-164-3	11-164-4	11-164-5
11-164-1	H - 7				09 NOV 93	
11-164-2	HLA - 1				09 NOV 93	
11-164-3	W - 3				09 NOV 93	
11-164-4	W - 4				09 NOV 93	
11-164-5	W - 1				09 NOV 93	
<hr/>						
Vol.Pri.Pol. (EPA 8260)						
Date Analyzed		11/16/93	11/16/93	11/16/93	11/17/93	11/16/93
Dilution Factor, Times		1	1	1	5	5
1,1,1-Trichloroethane, ug/L	<1	<1	<1	<5	<5	
1,1,2,2-Tetrachloroethane, ug/L	<1	<1	<1	<5	<5	
1,1,2-Trichloroethane, ug/L	<1	<1	<1	<5	<5	
1,1-Dichloroethane, ug/L	<1	<1	<1	12	8.4	
1,1-Dichloroethene, ug/L	<1	<1	<1	<5	<5	
1,2-Dichloroethane, ug/L	<1	<1	<1	<5	<5	
1,2-Dichlorobenzene, ug/L	<1	<1	<1	<5	<5	
1,2-Dichloropropane, ug/L	<1	<1	<1	<5	<5	
1,3-Dichlorobenzene, ug/L	<1	<1	<1	<5	<5	
1,4-Dichlorobenzene, ug/L	<1	<1	<1	<5	<5	
2-Chloroethylvinylether, ug/L	<1	<1	<1	<5	<5	
2-Hexanone, ug/L	<5	<5	<5	<30	<30	
Acetone, ug/L	<20	<20	<20	<100	<100	
Acrolein, ug/L	<50	<50	<50	<300	<300	
Acrylonitrile, ug/L	<50	<50	<50	<300	<300	
Bromodichloromethane, ug/L	<1	<1	<1	<5	<5	
Bromomethane, ug/L	<1	<1	<1	<5	<5	
Benzene, ug/L	<1	<1	<1	320	660	
Bromoform, ug/L	<1	<1	<1	<5	<5	
Chlorobenzene, ug/L	<1	<1	<1	<5	<5	

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
11-164-1	H - 7					09 NOV 93
11-164-2	HLA - 1					09 NOV 93
11-164-3	W - 3					09 NOV 93
11-164-4	W - 4					09 NOV 93
11-164-5	W - 1					09 NOV 93
PARAMETER		11-164-1	11-164-2	11-164-3	11-164-4	11-164-5
Carbon Tetrachloride, ug/L		<1	<1	<1	<5	<5
Chloroethane, ug/L		<1	<1	<1	<5	<5
Chloroform, ug/L		<1	<1	<1	<5	<5
Chloromethane, ug/L		<1	<1	<1	23	<5
Carbon Disulfide, ug/L		<2	<2	<2	<10	<10
Dibromochloromethane, ug/L		<1	<1	<1	<5	<5
Ethylbenzene, ug/L		<1	<1	<1	<5	69
Freon 113, ug/L		<2	<2	<2	<10	<10
Methyl ethyl ketone, ug/L		<5	<5	<5	<30	<30
Methyl isobutyl ketone, ug/L		<5	<5	<5	<30	<30
Methylene chloride, ug/L		<1	<1	<1	<5	15
Styrene, ug/L		<1	<1	<1	<5	<5
Trichloroethene, ug/L		<1	<1	<1	<5	<5
Trichlorofluoromethane, ug/L		<1	<1	<1	<5	<5
Toluene, ug/L		<1	<1	<1	5.4	<5
Tetrachloroethene, ug/L		<1	<1	<1	<5	<5
Vinyl acetate, ug/L		<10	<10	<10	<50	<50
Vinyl chloride, ug/L		<1	<1	<1	44	<5
Total Xylene Isomers, ug/L		<3	<3	<3	<20	58
cis-1,2-Dichloroethene, ug/L		<1	<1	<1	8.0	76
cis-1,3-Dichloropropene, ug/L		<1	<1	<1	<5	<5
trans-1,2-Dichloroethene, ug/L		<1	<1	<1	<5	<5
trans-1,3-Dichloropropene, ug/L		<1	<1	<1	<5	<5

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 5

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED				
PARAMETER		11-164-1	11-164-2	11-164-3	11-164-4	11-164-5
11-164-1	H - 7				09 NOV 93	
11-164-2	HLA - 1				09 NOV 93	
11-164-3	W - 3				09 NOV 93	
11-164-4	W - 4				09 NOV 93	
11-164-5	W - 1				09 NOV 93	
Other Vol.Pri.Pol. (EPA 8260)						
Semi-Quantified Results **						
2 C6 Cyclic Alkylated Hydrocarbon, ug/L	---	---	---	---	---	400
2 C9 Hydrocarbons, ug/L	---	---	---	---	---	100
3 C6 Hydrocarbon, ug/L	---	---	---	---	300	---
C5 Hydrocarbon, ug/L	---	---	---	---	100	---
C6 Cyclic Hydrocarbon, ug/L	---	---	---	---	---	50
C6 Hydrocarbon, ug/L	---	---	---	---	---	200
C7 Hydrocarbon, ug/L	---	---	---	---	---	100
C7 Hydrocarbon, ug/L	---	---	---	---	100	---

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 6

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		11-164-6	11-164-7	11-164-8
Alkalinity (310.1)				
Carbonate Alk (as CaCO ₃), mg/L	<1	<1	<1	
Bicarbonate Alk (as CaCO ₃), mg/L	600	610	700	
Hydroxide Alk (as CaCO ₃), mg/L	<1	<1	<1	
Total Alkalinity (as CaCO ₃), mg/L	600	610	700	
Calcium (6010), mg/L	230	210	170	
Magnesium (6010), mg/L	100	98	89	
Chloride (325.3), mg/L	1070	1000	570	
Copper (6010), mg/L	<0.02	<0.02	<0.02	
Surfactants, MBAS (425.1), mg/L	0.26	0.26	0.28	
Iron (6010), mg/L	0.32	0.21	0.25	
Manganese (6010), mg/L	0.15	0.14	0.10	
pH (150.1/9040), Units	6.9	6.9	7.0	
Potassium (6010), mg/L	10	9.6	8.2	
Sodium (6010), mg/L	600	580	300	
Sulfate (375.4), mg/L	3	4	20	
Conductivity (120.1), umhos/cm	4300	4300	2700	
Filterable Residue, TDS (160.1), mg/L	2600	2200	1600	
Zinc (6010), mg/L	0.035	0.019	0.012	
Ion Balance, Percent	3.59	3.86	0.95	

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 7

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		11-164-6	11-164-7	11-164-8
11-164-6	W - 2		09 NOV 93	
11-164-7	W - 5		09 NOV 93	
11-164-8	EW - 1		09 NOV 93	
Nitrate (353.2)				
Nitrate (as N), mg/L		<0.05	<0.05	<0.05
Nitrate (as NO ₃), mg/L		<0.2	<0.2	<0.2
Digestion (3010), Date		11/18/93	11/18/93	11/18/93
Aluminum (6010), mg/L		0.21	0.18	0.20
Fluoride (340.2), mg/L		0.094	0.091	0.14
TRPH/CADHS/418.1, mg/L		1.2	1.0	30
TPH (8015M)				
Date Analyzed		11/16/93	11/16/93	11/16/93
Date Extracted		11/15/93	11/15/93	11/15/93
Dilution Factor, Times 1		1	1	1
TPH (diesel), mg/L		<0.1	<0.1	1.1
TPH (gasoline), mg/L		---	---	5.9
TPH (total), mg/L		<1	<1	7.0

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 8

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		11-164-6	11-164-7	11-164-8
Vol.Pri.Pol. (EPA 8260)				
Date Analyzed		11/16/93	11/16/93	11/16/93
Dilution Factor, Times		1	1	5
1,1,1-Trichloroethane, ug/L		<1	<1	<5
1,1,2,2-Tetrachloroethane, ug/L		<1	<1	<5
1,1,2-Trichloroethane, ug/L		<1	<1	<5
1,1-Dichloroethane, ug/L		1.3	1.3	<5
1,1-Dichloroethene, ug/L		<1	<1	<5
1,2-Dichloroethane, ug/L		<1	<1	<5
1,2-Dichlorobenzene, ug/L		<1	<1	<5
1,2-Dichloropropane, ug/L		<1	<1	<5
1,3-Dichlorobenzene, ug/L		<1	<1	<5
1,4-Dichlorobenzene, ug/L		<1	<1	<5
2-Chloroethylvinylether, ug/L		<1	<1	<5
2-Hexanone, ug/L		<5	<5	<30
Acetone, ug/L		<20	<20	<100
Acrolein, ug/L		<50	<50	<300
Acrylonitrile, ug/L		<50	<50	<300
Bromodichloromethane, ug/L		<1	<1	<5
Bromomethane, ug/L		<1	<1	<5
Benzene, ug/L		130	130	190
Bromoform, ug/L		<1	<1	<5
Chlorobenzene, ug/L		<1	<1	<5
Carbon Tetrachloride, ug/L		<1	<1	<5
Chloroethane, ug/L		<1	<1	<5

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 9

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		11-164-6	11-164-7	11-164-8
Chloroform, ug/L		<1	<1	<5
Chloromethane, ug/L		<1	<1	<5
Carbon Disulfide, ug/L		<2	<2	<10
Dibromochloromethane, ug/L		<1	<1	<5
Ethylbenzene, ug/L		12	11	260
Freon 113, ug/L		<2	<2	<10
Methyl ethyl ketone, ug/L		<5	<5	<30
Methyl isobutyl ketone, ug/L		<5	<5	<30
Methylene chloride, ug/L		2.6	1.5	<5
Styrene, ug/L		<1	<1	<5
Trichloroethene, ug/L		<1	<1	<5
Trichlorofluoromethane, ug/L		<1	<1	<5
Toluene, ug/L		1.1	<1	<5
Tetrachloroethene, ug/L		<1	<1	<5
Vinyl acetate, ug/L		<10	<10	<50
Vinyl chloride, ug/L		5.8	5.8	<5
Total Xylene Isomers, ug/L		<3	<3	59
cis-1,2-Dichloroethene, ug/L		100	98	27
cis-1,3-Dichloropropene, ug/L		<1	<1	<5
trans-1,2-Dichloroethene, ug/L		21	21	25
trans-1,3-Dichloropropene, ug/L		<1	<1	<5
Other Vol.Pri.Pol. (EPA 8260)		---	---	---
Semi-Quantified Results **		---	---	1000
2 C6 Cyclic Alkylated Hydrocarbon, ug/L		---	---	1000

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 10

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED		
PARAMETER		11-164-6	11-164-7	11-164-8
2 C6 Hydrocarbon, ug/L		80	---	---
2 C9 Hydrocarbons, ug/L		60	---	---
A C10 Hydrocarbon, ug/L		---	---	50
C5 Cyclic Alkylated Hydrocarbon, ug/L		20	20	100
C6 Cyclic Hydrocarbon, ug/L		200	200	1000
C6 Cyclic Alkylated Hydrocarbon, ug/L		40	40	---
C6 Hydrocarbon, ug/L		---	50	500
C8 Hydrocarbon, ug/L		40	40	300
C9 Hydrocarbon, ug/L		---	50	300

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 11

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
11-164-9	Trip Blank	
PARAMETER		11-164-9
Vol.Pri.Pol. (EPA 8260)		
Date Analyzed		11/16/93
Dilution Factor, Times		1
1,1,1-Trichloroethane, ug/L		<1
1,1,2,2-Tetrachloroethane, ug/L		<1
1,1,2-Trichloroethane, ug/L		<1
1,1-Dichloroethane, ug/L		<1
1,1-Dichloroethene, ug/L		<1
1,2-Dichloroethane, ug/L		<1
1,2-Dichlorobenzene, ug/L		<1
1,2-Dichloropropane, ug/L		<1
1,3-Dichlorobenzene, ug/L		<1
1,4-Dichlorobenzene, ug/L		<1
2-Chloroethylvinylether, ug/L		<1
2-Hexanone, ug/L		<5
Acetone, ug/L		<20
Acrolein, ug/L		<50
Acrylonitrile, ug/L		<50
Bromodichloromethane, ug/L		<1
Bromomethane, ug/L		<1
Benzene, ug/L		<1
Bromoform, ug/L		<1
Chlorobenzene, ug/L		<1
Carbon Tetrachloride, ug/L		<1
Chloroethane, ug/L		<1
Chloroform, ug/L		<1
Chloromethane, ug/L		<1

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G93-11-164

Received: 11 NOV 93

Ms. Rachel Martinez
Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project: 24246.2.3

REPORT OF ANALYTICAL RESULTS

Page 12

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
11-164-9	Trip Blank	11-164-9
PARAMETER		
Carbon Disulfide, ug/L	<2	
Dibromochloromethane, ug/L	<1	
Ethylbenzene, ug/L	<1	
Freon 113, ug/L	<2	
Methyl ethyl ketone, ug/L	<5	
Methyl isobutyl ketone, ug/L	<5	
Methylene chloride, ug/L	<1	
Styrene, ug/L	<1	
Trichloroethene, ug/L	<1	
Trichlorofluoromethane, ug/L	<1	
Toluene, ug/L	<1	
Tetrachloroethene, ug/L	<1	
Vinyl acetate, ug/L	<10	
Vinyl chloride, ug/L	<1	
Total Xylene Isomers, ug/L	<3	
cis-1,2-Dichloroethene, ug/L	<1	
cis-1,3-Dichloropropene, ug/L	<1	
trans-1,2-Dichloroethene, ug/L	<1	
trans-1,3-Dichloropropene, ug/L	<1	
Other Vol.Pri.Pol. (EPA 8260)	---	

Rachel Martinez for.

James C. Hein, Laboratory Director

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 1

LABORATORY CONTROL STANDARDS
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER		DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
1. TRPH/CADHS/418.1	C3101472*1	11.24.93	93189	1.9	2.51	mg/L	76
2. TPH (8015M)	C3112243*1						
Date Analyzed		11.16.93	93125	11/16/93	11/16/93	Date	N/A
Date Extracted		11.16.93	93125	11/15/93	11/15/93	Date	N/A
TPH (diesel)		11.16.93	93125	18.7	20.0	mg/L	93
TPH (gasoline)		11.16.93	93125	9.01	10.0	mg/L	90
TPH (total)		11.16.93	93125	27.7	30.0	mg/L	92
3. TPH (8015M)	C3112244*1						
Date Analyzed		11.16.93	93125	11/16/93	11/16/93	Date	N/A
Date Extracted		11.16.93	93125	11/15/93	11/15/93	Date	N/A
TPH (diesel)		11.16.93	93125	18.9	20.0	mg/L	94
TPH (gasoline)		11.16.93	93125	9.10	10.0	mg/L	91
TPH (total)		11.16.93	93125	28.0	30.0	mg/L	93
4. Vol.Pri.Pol. (EPA 8260	C3111722*1						
Date Analyzed		11.16.93	93812	11/16/93	11/16/93	Date	N/A
1,1,1-Trichloroethane		11.16.93	93812	16.4	20.0	ug/L	82
1,1,2,2-Tetrachloroethane		11.16.93	93812	16.5	20.0	ug/L	82
1,2-Trichloroethane		11.16.93	93812	17.5	20.0	ug/L	87
1-Dichloroethane		11.16.93	93812	18.1	20.0	ug/L	90
1,1-Dichloroethene		11.16.93	93812	18.2	20.0	ug/L	91
1,2-Dichloroethane		11.16.93	93812	16.7	20.0	ug/L	83
1,2-Dichlorobenzene		11.16.93	93812	17.6	20.0	ug/L	88
1,2-Dichloropropane		11.16.93	93812	18.0	20.0	ug/L	90
1,3-Dichlorobenzene		11.16.93	93812	17.3	20.0	ug/L	86
1,4-Dichlorobenzene		11.16.93	93812	17.1	20.0	ug/L	85
2-Hexanone		11.16.93	93812	18.2	20.0	ug/L	91
Acetone		11.16.93	93812	22.8	20.0	ug/L	114
Bromodichloromethane		11.16.93	93812	16.1	20.0	ug/L	80
Bromomethane		11.16.93	93812	19.3	20.0	ug/L	96
Benzene		11.16.93	93812	16.9	20.0	ug/L	84
Bromoform		11.16.93	93812	14.6	20.0	ug/L	73
Chlorobenzene		11.16.93	93812	18.3	20.0	ug/L	91
Carbon Tetrachloride		11.16.93	93812	18.0	20.0	ug/L	90
Chloroethane		11.16.93	93812	21.4	20.0	ug/L	107
Chloroform		11.16.93	93812	17.8	20.0	ug/L	89
Chloromethane		11.16.93	93812	19.8	20.0	ug/L	99
Carbon Disulfide		11.16.93	93812	19.1	20.0	ug/L	95
Dibromochloromethane		11.16.93	93812	16.0	20.0	ug/L	80
Ethylbenzene		11.16.93	93812	17.4	20.0	ug/L	87
Methyl ethyl ketone		11.16.93	93812	19.2	20.0	ug/L	96
Methyl isobutyl ketone		11.16.93	93812	14.4	20.0	ug/L	72
Methylene chloride		11.16.93	93812	18.8	20.0	ug/L	94
Styrene		11.16.93	93812	20.2	20.0	ug/L	101
1-chloroethene		11.16.93	93812	18.0	20.0	ug/L	90
1-chlorofluoromethane		11.16.93	93812	15.3	20.0	ug/L	76

BC ANALYTICAL
ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 2

LABORATORY CONTROL STANDARDS
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
Toluene	11.16.93	93812	17.5	20.0	ug/L	87
Tetrachloroethene	11.16.93	93812	18.2	20.0	ug/L	91
Vinyl acetate	11.16.93	93812	14.3	20.0	ug/L	71
Vinyl chloride	11.16.93	93812	21.9	20.0	ug/L	109
Total Xylene Isomers	11.16.93	93812	55.7	60.0	ug/L	93
cis-1,3-Dichloropropene	11.16.93	93812	19.3	20.0	ug/L	96
trans-1,2-Dichloroethene	11.16.93	93812	17.5	20.0	ug/L	87
trans-1,3-Dichloropropene	11.16.93	93812	13.5	20.0	ug/L	67
5. Vol.Pri.Pol. (EPA 8260 C3111723*1						
Date Analyzed	11.16.93	93812	11/16/93	11/16/93	Date	N/A
1,1,1-Trichloroethane	11.16.93	93812	16.4	20.0	ug/L	82
1,1,2,2-Tetrachloroethane	11.16.93	93812	17.2	20.0	ug/L	86
1,1,2-Trichloroethane	11.16.93	93812	17.8	20.0	ug/L	89
1,1-Dichloroethane	11.16.93	93812	18.5	20.0	ug/L	92
1,1-Dichloroethene	11.16.93	93812	17.5	20.0	ug/L	87
1,2-Dichloroethane	11.16.93	93812	16.7	20.0	ug/L	83
1,2-Dichlorobenzene	11.16.93	93812	17.6	20.0	ug/L	88
1,2-Dichloropropane	11.16.93	93812	18.2	20.0	ug/L	91
1,3-Dichlorobenzene	11.16.93	93812	17.0	20.0	ug/L	85
1,4-Dichlorobenzene	11.16.93	93812	16.7	20.0	ug/L	83
2-Hexanone	11.16.93	93812	20.2	20.0	ug/L	101
Acetone	11.16.93	93812	25.1	20.0	ug/L	125
Bromodichloromethane	11.16.93	93812	16.3	20.0	ug/L	81
Bromomethane	11.16.93	93812	20.2	20.0	ug/L	101
Benzene	11.16.93	93812	17.3	20.0	ug/L	86
Bromoform	11.16.93	93812	15.0	20.0	ug/L	75
Chlorobenzene	11.16.93	93812	18.6	20.0	ug/L	93
Carbon Tetrachloride	11.16.93	93812	17.6	20.0	ug/L	88
Chloroethane	11.16.93	93812	19.6	20.0	ug/L	98
Chloroform	11.16.93	93812	17.9	20.0	ug/L	89
Chloromethane	11.16.93	93812	20.6	20.0	ug/L	103
Carbon Disulfide	11.16.93	93812	18.5	20.0	ug/L	92
Dibromochloromethane	11.16.93	93812	16.0	20.0	ug/L	80
Ethylbenzene	11.16.93	93812	17.3	20.0	ug/L	86
Methyl ethyl ketone	11.16.93	93812	21.3	20.0	ug/L	106
Methyl isobutyl ketone	11.16.93	93812	15.6	20.0	ug/L	78
Methylene chloride	11.16.93	93812	19.2	20.0	ug/L	96
Styrene	11.16.93	93812	20.1	20.0	ug/L	100
Trichloroethene	11.16.93	93812	18.2	20.0	ug/L	91
Trichlorofluoromethane	11.16.93	93812	14.4	20.0	ug/L	72
Toluene	11.16.93	93812	18.0	20.0	ug/L	90
Tetrachloroethene	11.16.93	93812	18.1	20.0	ug/L	90
Vinyl acetate	11.16.93	93812	14.4	20.0	ug/L	72
Vinyl chloride	11.16.93	93812	21.1	20.0	ug/L	105
Total Xylene Isomers	11.16.93	93812	55.6	60.0	ug/L	93

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 3

LABORATORY CONTROL STANDARDS
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER		DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
cis-1,3-Dichloropropene		11.16.93	93812	19.4	20.0	ug/L	97
trans-1,2-Dichloroethene		11.16.93	93812	17.4	20.0	ug/L	87
trans-1,3-Dichloropropene		11.16.93	93812	13.5	20.0	ug/L	67
6. Alkalinity (310.1)	C311830*1						
Bicarbonate Alk (as CaCO ₃)		11.22.93	9349	594	596	mg/L	100
Total Alkalinity (as CaCO ₃)		11.22.93	9349	594	596	mg/L	100
7. Calcium (6010)	C3111909*1	11.19.93	931613	49.6	50.0	mg/L	99
8. Magnesium (6010)	C3111916*1	11.19.93	931613	48.2	50.0	mg/L	96
9. Chloride (325.3)	C3111159*1	11.17.93	9375	20.2	20.0	mg/L	101
10. Copper (6010)	C310362*1	11.19.93	931613	2.77	3.00	mg/L	92
11. Surfactants, MBAS	C3111777*1	11.11.93	93104	0.840	1.00	mg/L	84
12. Surfactants, MBAS	C3111196*1	11.11.93	93104	0.840	1.00	mg/L	84
13. Iron (6010)	C3111847*1	11.19.93	931613	2.99	3.00	mg/L	100
14. Manganese (6010)	C3111848*1	11.19.93	931613	2.93	3.00	mg/L	98
15. pH (150.1/9040)	C3111080*1	11.11.93	93509	6.01	6.00	Units	100
16. Potassium (6010)	C3111915*1	11.19.93	931613	47.4	50.0	mg/L	95
17. Sodium (6010)	C3111622*1	11.19.93	931613	51.6	50.0	mg/L	103
Sulfate (375.4)	C3111200*1	11.14.93	9363	20.6	20.0	mg/L	103
Sp. Conductance	C3111738*1						
Date Analyzed		11.17.93	9394	11.17.93	11.17.93	Date	N/A
Conductivity (120.1)		11.17.93	9394	1430	1410	umhos/cm	101
20. Filterable Residue	C3111118*1	11.18.93	93106	1020	1000	mg/L	102
21. Zinc (6010)	C3102309*1	11.19.93	931613	2.93	3.00	mg/L	98
22. Nitrate (EPA 353.2)	C3111021*1						
Date Analyzed		11.17.93	93328	11/17/93	11/17/93	Date	N/A
Nitrate (as N)		11.17.93	93328	4.49	4.51	mg/L	100
Nitrate (as NO ₃)		11.17.93	93328	19.9	20.0	mg/L	99
23. Nitrate (353.2)	C3111077*1						
Nitrate (as N)		11.17.93	93328	4.87	4.51	mg/L	108
Nitrate (as NO ₃)		11.17.93	93328	21.6	20.0	mg/L	108
24. Digestion (3010)	C3111755*1	11.18.93	931613	11/18/93	11/18/93	Date	N/A
25. Aluminum (6010)	C3111908*1	11.19.93	931613	2.93	3.00	mg/L	98
26. Fluoride (EPA 340.2)	C311865*1						
Date Analyzed		11.16.93	9350	11/16/93	11/16/93	Date	N/A
Fluoride (340.2)		11.16.93	9350	0.944	1.00	mg/L	94
27. Filterable Residue	C311775*1	11.16.93	93104	1010	1000	mg/L	101
28. TDS (EPA 160.1)	C3111726*1						
Date Analyzed		11.16.93	93104	11/16/93	11/16/93	Date	N/A
Filterable Residue, TDS (160.1)		11.16.93	93104	1010	1000	mg/L	101
29. EPA 8240 VOCs	C3111729*1						
Date Analyzed		11.17.93	93223	11/17/93	11/17/93	Date	N/A
1,1,1-Trichloroethane		11.17.93	93223	16.3	20.0	ug/L	81
1,1,2,2-Tetrachloroethane		11.17.93	93223	16.9	20.0	ug/L	84
1,2-Trichloroethane		11.17.93	93223	21.0	20.0	ug/L	105
1-Dichloroethane		11.17.93	93223	19.7	20.0	ug/L	98

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 4

LABORATORY CONTROL STANDARDS
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
1,1-Dichloroethene	11.17.93	93223	18.9	20.0	ug/L	94
1,2-Dichloroethane	11.17.93	93223	17.5	20.0	ug/L	87
1,2-Dichloropropane	11.17.93	93223	20.3	20.0	ug/L	101
2-Hexanone	11.17.93	93223	14.4	20.0	ug/L	72
Acetone	11.17.93	93223	17.6	20.0	ug/L	88
Bromodichloromethane	11.17.93	93223	17.5	20.0	ug/L	87
Bromomethane	11.17.93	93223	23.0	20.0	ug/L	115 Q
Benzene	11.17.93	93223	19.9	20.0	ug/L	99
Bromoform	11.17.93	93223	18.7	20.0	ug/L	93
Chlorobenzene	11.17.93	93223	19.3	20.0	ug/L	96
Carbon Tetrachloride	11.17.93	93223	16.5	20.0	ug/L	82
Chloroethane	11.17.93	93223	22.0	20.0	ug/L	110
Chloroform	11.17.93	93223	17.2	20.0	ug/L	86
Chloromethane	11.17.93	93223	20.8	20.0	ug/L	104
Carbon Disulfide	11.17.93	93223	24.2	20.0	ug/L	121
Dibromochloromethane	11.17.93	93223	18.7	20.0	ug/L	93
Ethylbenzene	11.17.93	93223	17.5	20.0	ug/L	87
Methyl ethyl ketone	11.17.93	93223	13.4	20.0	ug/L	67
Methyl isobutyl ketone	11.17.93	93223	11.9	20.0	ug/L	59
Methylene chloride	11.17.93	93223	20.0	20.0	ug/L	100
Styrene	11.17.93	93223	20.1	20.0	ug/L	100
Trichloroethene	11.17.93	93223	20.3	20.0	ug/L	101
Toluene	11.17.93	93223	19.2	20.0	ug/L	96
Tetrachloroethene	11.17.93	93223	21.4	20.0	ug/L	107
Vinyl acetate	11.17.93	93223	15.6	20.0	ug/L	78
Vinyl chloride	11.17.93	93223	23.3	20.0	ug/L	116 Q
Total Xylene Isomers	11.17.93	93223	50.9	60.0	ug/L	85
cis-1,3-Dichloropropene	11.17.93	93223	18.5	20.0	ug/L	92
trans-1,2-Dichloroethene	11.17.93	93223	18.5	20.0	ug/L	92
trans-1,3-Dichloropropene	11.17.93	93223	13.8	20.0	ug/L	69
1,2-Dichloroethane-d4 Reported	11.17.93	93223	43.4	50.0	ug/L	87
1,2-Dichloroethane-d4 Theo.	11.17.93	93223	50.0	50.0	ug/L	100
4-Bromofluorobenzene Reported	11.17.93	93223	44.3	50.0	ug/L	89
4-Bromofluorobenzene Theo.	11.17.93	93223	50.0	50.0	ug/L	100
Toluene-d8 Reported	11.17.93	93223	49.9	50.0	ug/L	100
Toluene-d8 Theo.	11.17.93	93223	50.0	50.0	ug/L	100
30. EPA 8240 VOCs	C3111807*1					
Date Analyzed	11.18.93	93223	11/18/93	11/18/93	Date	N/A
1,1,1-Trichloroethane	11.18.93	93223	15.6	20.0	ug/L	78
1,1,2,2-Tetrachloroethane	11.18.93	93223	19.6	20.0	ug/L	98
1,1,2-Trichloroethane	11.18.93	93223	22.4	20.0	ug/L	112
1,1-Dichloroethane	11.18.93	93223	19.2	20.0	ug/L	96
1,1-Dichloroethene	11.18.93	93223	16.9	20.0	ug/L	84
1,2-Dichloroethane	11.18.93	93223	18.8	20.0	ug/L	94
1,2-Dichloropropane	11.18.93	93223	21.4	20.0	ug/L	107

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 5

LABORATORY CONTROL STANDARDS
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
2-Hexanone	11.18.93	93223	18.4	20.0	ug/L	92
Acetone	11.18.93	93223	21.7	20.0	ug/L	108
Bromodichloromethane	11.18.93	93223	18.5	20.0	ug/L	92
Bromomethane	11.18.93	93223	20.9	20.0	ug/L	104
Benzene	11.18.93	93223	19.5	20.0	ug/L	97
Bromoform	11.18.93	93223	20.7	20.0	ug/L	103
Chlorobenzene	11.18.93	93223	20.4	20.0	ug/L	102
Carbon Tetrachloride	11.18.93	93223	15.3	20.0	ug/L	76
Chloroethane	11.18.93	93223	19.2	20.0	ug/L	96
Chloroform	11.18.93	93223	17.0	20.0	ug/L	85
Chloromethane	11.18.93	93223	18.2	20.0	ug/L	91
Carbon Disulfide	11.18.93	93223	22.2	20.0	ug/L	111
Dibromochloromethane	11.18.93	93223	20.2	20.0	ug/L	101
Ethylbenzene	11.18.93	93223	17.1	20.0	ug/L	85
Methyl ethyl ketone	11.18.93	93223	17.0	20.0	ug/L	85
Methyl isobutyl ketone	11.18.93	93223	14.5	20.0	ug/L	72
Methylene chloride	11.18.93	93223	20.0	20.0	ug/L	100
Yrene	11.18.93	93223	21.3	20.0	ug/L	106
1-chloroethene	11.18.93	93223	26.0	20.0	ug/L	130 Q
Toluene	11.18.93	93223	19.7	20.0	ug/L	98
Tetrachloroethene	11.18.93	93223	21.2	20.0	ug/L	106
Vinyl acetate	11.18.93	93223	15.7	20.0	ug/L	78
Vinyl chloride	11.18.93	93223	19.3	20.0	ug/L	96
Total Xylene Isomers	11.18.93	93223	54.8	60.0	ug/L	91
cis-1,3-Dichloropropene	11.18.93	93223	19.3	20.0	ug/L	96
trans-1,2-Dichloroethene	11.18.93	93223	18.2	20.0	ug/L	91
trans-1,3-Dichloropropene	11.18.93	93223	14.6	20.0	ug/L	73
1,2-Dichloroethane-d4 Reported	11.18.93	93223	42.4	50.0	ug/L	85
1,2-Dichloroethane-d4 Theo.	11.18.93	93223	50.0	50.0	ug/L	100
4-Bromofluorobenzene Reported	11.18.93	93223	45.9	50.0	ug/L	92
4-Bromofluorobenzene Theo.	11.18.93	93223	50.0	50.0	ug/L	100
Toluene-d8 Reported	11.18.93	93223	51.5	50.0	ug/L	103
Toluene-d8 Theo.	11.18.93	93223	50.0	50.0	ug/L	100
31. Sulfate (EPA 375.4)	C3111743*1					
Date Analyzed		11.18.93	9364	11/18/93	11/18/93 Date	N/A
Sulfate (375.4)		11.18.93	9364	18.3	20.0 mg/L	91
32. Alkalinity (310.1)	C3111076*1					
Bicarbonate Alk (as CaCO ₃)		11.23.93	9350	581	596 mg/L	97
Total Alkalinity (as CaCO ₃)		11.23.93	9350	581	596 mg/L	97

BC ANALYTICAL
ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 1

ADDITIONAL LCS PRECISION (DUPLICATES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	LC1 RESULT	LC2 RESULT	UNIT	RELATIVE % DIFF
1. TPH (8015M)							
Date Analyzed		11.16.93	93125	11/16/93	11/16/93	Date	N/A
Date Extracted		11.16.93	93125	11/15/93	11/15/93	Date	N/A
TPH (diesel)		11.16.93	93125	18.7	18.9	mg/L	1
TPH (gasoline)		11.16.93	93125	9.01	9.10	mg/L	1
TPH (total)		11.16.93	93125	27.7	28.0	mg/L	1
2. Vol.Pri.Pol. (EPA 8260)							
Date Analyzed		11.16.93	93812	11/16/93	11/16/93	Date	N/A
1,1,1-Trichloroethane		11.16.93	93812	16.4	16.4	ug/L	0
1,1,2,2-Tetrachloroethane		11.16.93	93812	16.5	17.2	ug/L	4
1,1,2-Trichloroethane		11.16.93	93812	17.5	17.8	ug/L	2
1,1-Dichloroethane		11.16.93	93812	18.1	18.5	ug/L	2
1,1-Dichloroethene		11.16.93	93812	18.2	17.5	ug/L	4
1,2-Dichloroethane		11.16.93	93812	16.7	16.7	ug/L	0
1,2-Dichlorobenzene		11.16.93	93812	17.6	17.6	ug/L	0
1,2-Dichloropropane		11.16.93	93812	18.0	18.2	ug/L	1
1,3-Dichlorobenzene		11.16.93	93812	17.3	17.0	ug/L	2
1,4-Dichlorobenzene		11.16.93	93812	17.1	16.7	ug/L	2
2-Hexanone		11.16.93	93812	18.2	20.2	ug/L	10
Acetone		11.16.93	93812	22.8	25.1	ug/L	10
Bromodichloromethane		11.16.93	93812	16.1	16.3	ug/L	1
Bromomethane		11.16.93	93812	19.3	20.2	ug/L	5
Benzene		11.16.93	93812	16.9	17.3	ug/L	2
Bromoform		11.16.93	93812	14.6	15.0	ug/L	3
Chlorobenzene		11.16.93	93812	18.3	18.6	ug/L	2
Carbon Tetrachloride		11.16.93	93812	18.0	17.6	ug/L	2
Chloroethane		11.16.93	93812	21.4	19.6	ug/L	9
Chloroform		11.16.93	93812	17.8	17.9	ug/L	1
Chloromethane		11.16.93	93812	19.8	20.6	ug/L	4
Carbon Disulfide		11.16.93	93812	19.1	18.5	ug/L	3
Dibromochloromethane		11.16.93	93812	16.0	16.0	ug/L	0
Ethylbenzene		11.16.93	93812	17.4	17.3	ug/L	1
Methyl ethyl ketone		11.16.93	93812	19.2	21.3	ug/L	10
Methyl isobutyl ketone		11.16.93	93812	14.4	15.6	ug/L	8
Methylene chloride		11.16.93	93812	18.8	19.2	ug/L	2
Styrene		11.16.93	93812	20.2	20.1	ug/L	0
Trichloroethene		11.16.93	93812	18.0	18.2	ug/L	1
Trichlorofluoromethane		11.16.93	93812	15.3	14.4	ug/L	6
Toluene		11.16.93	93812	17.5	18.0	ug/L	3
Tetrachloroethene		11.16.93	93812	18.2	18.1	ug/L	1
Vinyl acetate		11.16.93	93812	14.3	14.4	ug/L	1
Vinyl chloride		11.16.93	93812	21.9	21.1	ug/L	4
Total Xylene Isomers		11.16.93	93812	55.7	55.6	ug/L	0
cis-1,3-Dichloropropene		11.16.93	93812	19.3	19.4	ug/L	0
trans-1,2-Dichloroethene		11.16.93	93812	17.5	17.4	ug/L	1

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 2

ADDITIONAL LCS PRECISION (DUPLICATES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	LC1 RESULT	LC2 RESULT	UNIT	RELATIVE % DIFF
trans-1,3-Dichloropropene		11.16.93	93812	13.5	13.5	ug/L	0
3. Surfactants, MBAS		11.11.93	93104	0.840	0.840	mg/L	0
4. Nitrate (353.2)							
Nitrate (as N)		11.17.93	93328	4.49	4.87	mg/L	8
Nitrate (as NO ₃)		11.17.93	93328	19.9	21.6	mg/L	8
5. EPA 8240 VOCs							
Date Analyzed		11.17.93	93223	11/17/93	11/18/93	Date	N/A
1,1,1-Trichloroethane		11.17.93	93223	16.3	15.6	ug/L	4
1,1,2,2-Tetrachloroethane		11.17.93	93223	16.9	19.6	ug/L	15
1,1,2-Trichloroethane		11.17.93	93223	21.0	22.4	ug/L	6
1,1-Dichloroethane		11.17.93	93223	19.7	19.2	ug/L	3
1,1-Dichloroethene		11.17.93	93223	18.9	16.9	ug/L	11
1,2-Dichloroethane		11.17.93	93223	17.5	18.8	ug/L	7
1,2-Dichloropropane		11.17.93	93223	20.3	21.4	ug/L	5
2-Hexanone		11.17.93	93223	14.4	18.4	ug/L	24
Acetone		11.17.93	93223	17.6	21.7	ug/L	21
Bromodichloromethane		11.17.93	93223	17.5	18.5	ug/L	6
Bromomethane		11.17.93	93223	23.0	20.9	ug/L	10
Benzene		11.17.93	93223	19.9	19.5	ug/L	2
Bromoform		11.17.93	93223	18.7	20.7	ug/L	10
Chlorobenzene		11.17.93	93223	19.3	20.4	ug/L	5
Carbon Tetrachloride		11.17.93	93223	16.5	15.3	ug/L	7
Chloroethane		11.17.93	93223	22.0	19.2	ug/L	14
Chloroform		11.17.93	93223	17.2	17.0	ug/L	1
Chloromethane		11.17.93	93223	20.8	18.2	ug/L	13
Carbon Disulfide		11.17.93	93223	24.2	22.2	ug/L	9
Dibromochloromethane		11.17.93	93223	18.7	20.2	ug/L	8
Ethylbenzene		11.17.93	93223	17.5	17.1	ug/L	2
Methyl ethyl ketone		11.17.93	93223	13.4	17.0	ug/L	24
Methyl isobutyl ketone		11.17.93	93223	11.9	14.5	ug/L	20
Methylene chloride		11.17.93	93223	20.0	20.0	ug/L	0
Styrene		11.17.93	93223	20.1	21.3	ug/L	6
Trichloroethene		11.17.93	93223	20.3	26.0	ug/L	25
Toluene		11.17.93	93223	19.2	19.7	ug/L	3
Tetrachloroethene		11.17.93	93223	21.4	21.2	ug/L	1
Vinyl acetate		11.17.93	93223	15.6	15.7	ug/L	1
Vinyl chloride		11.17.93	93223	23.3	19.3	ug/L	19
Total Xylene Isomers		11.17.93	93223	50.9	54.8	ug/L	7
cis-1,3-Dichloropropene		11.17.93	93223	18.5	19.3	ug/L	4
trans-1,2-Dichloroethene		11.17.93	93223	18.5	18.2	ug/L	2
trans-1,3-Dichloropropene		11.17.93	93223	13.8	14.6	ug/L	6
1,2-Dichloroethane-d4 Reported		11.17.93	93223	43.4	42.4	ug/L	2
1,2-Dichloroethane-d4 Theo.		11.17.93	93223	50.0	50.0	ug/L	0
Bromofluorobenzene Reported		11.17.93	93223	44.3	45.9	ug/L	3
Bromofluorobenzene Theo.		11.17.93	93223	50.0	50.0	ug/L	0

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 3

ADDITIONAL LCS PRECISION (DUPLICATES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	LC1 RESULT	LC2 RESULT	UNIT	RELATIVE % DIFF
Toluene-d8 Reported		11.17.93	93223	49.9	51.5	ug/L	3
Toluene-d8 Theo.		11.17.93	93223	50.0	50.0	ug/L	0

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 1

MATRIX QC PRECISION (DUPLICATES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	R1 RESULT	R2 RESULT	UNIT	RELATIVE % DIFF
1. pH (150.1/9040)	9311164*2	11.11.93	93509	7.2	7.2	Units	0
2. Sp. Conductance	9311138*1						
Date Analyzed		11.17.93	9394	11.17.93	11.17.93	Date	N/A
Conductivity (120.1)		11.17.93	9394	530	530	umhos/cm	0

BC ANALYTICAL
ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 1

**MATRIX QC PRECISION (DUPLICATE SPIKES)
BATCH QC REPORT**

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	MS RESULT	MSD RESULT	UNIT	RELATIVE % DIFF
1. TRPH/CADHS/418.1	9311164*2	11.24.93	93189	4.60	4.80	mg/L	4
2. Vol.Pri.Pol. (EPA 8260	9311164*1						
Date Analyzed		11.16.93	93812	11/16/93	11/16/93	Date	N/A
1,1-Dichloroethene		11.16.93	93812	48.7	50.8	ug/L	4
Benzene		11.16.93	93812	44.1	49.5	ug/L	11
Chlorobenzene		11.16.93	93812	52.9	56.3	ug/L	6
Trichloroethene		11.16.93	93812	46.2	47.3	ug/L	2
Toluene		11.16.93	93812	49.7	53.2	ug/L	7
3. Alkalinity (310.1)	9311117*10						
Bicarbonate Alk (as CaCO ₃)		11.22.93	9349	490	490	mg/L	0
Total Alkalinity (as CaCO ₃)		11.22.93	9349	490	490	mg/L	0
4. Calcium (6010)	9311164*2	11.19.93	931613	105	101	mg/L	4
5. Magnesium (6010)	9311164*2	11.19.93	931613	66.6	64.7	mg/L	3
6. Chloride (EPA 325.3)	9311138*1						
Date Analyzed		11.17.93	9375	11/17/93	11/17/93	Date	N/A
Chloride (325.3)		11.17.93	9375	49.1	49.5	mg/L	1
7. Copper (6010)	9311128*1	11.19.93	931613	0.515	0.556	mg/L	8
8. Copper (6010)	9311164*2	11.19.93	931613	0.479	0.474	mg/L	1
9. Surfactants, MBAS	9311152*1	11.11.93	93104	24.8	22.1	mg/L	11
10. Iron (6010)	9311164*2	11.19.93	931613	1.88	1.82	mg/L	3
11. Manganese (6010)	9311164*2	11.19.93	931613	0.416	0.406	mg/L	2
12. Potassium (6010)	9311164*2	11.19.93	931613	15.1	14.6	mg/L	3
13. Sodium (6010)	9311164*2	11.20.93	931613	979	987	mg/L	1
14. Sulfate (375.4)	9311073*1	11.14.93	9363	34.3	33.9	mg/L	1
15. Filterable Residue	9311164*2	11.18.93	93106	4230	4080	mg/L	4
16. Zinc (6010)	9311128*1	11.19.93	931613	0.591	0.621	mg/L	5
17. Zinc (6010)	9311164*2	11.19.93	931613	0.525	0.524	mg/L	0
18. Nitrate (EPA 353.2)	9311138*1						
Date Analyzed		11.17.93	93328	11/17/93	11/17/93	Date	N/A
Nitrate (as N)		11.17.93	93328	0.636	0.650	mg/L	2
Nitrate (as NO ₃)		11.17.93	93328	2.82	2.88	mg/L	2
19. Nitrate (353.2)	9311155*3						
Nitrate (as N)		11.17.93	93328	1.41	1.50	mg/L	6
Nitrate (as NO ₃)		11.17.93	93328	6.26	6.67	mg/L	6
20. Digestion (3010)	9311128*1	11.18.93	931613	11/18/93	11/18/93	Date	N/A
21. Digestion (3010)	9311164*2	11.18.93	931613	11/18/93	11/18/93	Date	N/A
22. Aluminum (6010)	9311164*2	11.19.93	931613	1.35	1.65	mg/L	20
23. Fluoride (EPA 340.2)	9311138*1						
Date Analyzed		11.16.93	9350	11/16/93	11/16/93	Date	N/A
Fluoride (340.2)		11.16.93	9350	1.48	1.42	mg/L	4
24. TDS (EPA 160.1)	9311138*3						
Date Analyzed		11.16.93	93104	11/16/93	11/16/93	Date	N/A
Filterable Residue, TDS (160.1)		11.16.93	93104	4370	4380	mg/L	0
25. EPA 8240 VOCs	9311150*1						
Date Analyzed		11.17.93	93223	11/17/93	11/17/93	Date	N/A

BC ANALYTICAL
ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 2

**MATRIX QC PRECISION (DUPLICATE SPIKES)
BATCH QC REPORT**

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	MS RESULT	MSD RESULT	UNIT	RELATIVE % DIFF
1,1,1-Trichloroethane		11.17.93	93223	16.9	15.3	ug/L	10
1,1,2,2-Tetrachloroethane		11.17.93	93223	13.5	17.5	ug/L	26
1,1,2-Trichloroethane		11.17.93	93223	16.8	20.2	ug/L	18
1,1-Dichloroethane		11.17.93	93223	19.8	18.3	ug/L	8
1,1-Dichloroethene		11.17.93	93223	20.8	18.0	ug/L	14
1,2-Dichloroethane		11.17.93	93223	14.8	16.7	ug/L	12
1,2-Dichloropropane		11.17.93	93223	17.9	19.2	ug/L	7
2-Hexanone		11.17.93	93223	9.47	16.6	ug/L	55 Q
Acetone		11.17.93	93223	17.5	23.3	ug/L	28
Bromodichloromethane		11.17.93	93223	15.2	16.4	ug/L	8
Bromomethane		11.17.93	93223	24.0	22.9	ug/L	5
Benzene		11.17.93	93223	18.6	18.8	ug/L	1
Bromoform		11.17.93	93223	15.4	18.7	ug/L	19
Chlorobenzene		11.17.93	93223	19.1	19.1	ug/L	0
Carbon Tetrachloride		11.17.93	93223	17.3	15.2	ug/L	13
Chloroethane		11.17.93	93223	23.8	21.8	ug/L	9
Chloroform		11.17.93	93223	17.6	16.3	ug/L	8
Chloromethane		11.17.93	93223	22.2	20.9	ug/L	6
Carbon Disulfide		11.17.93	93223	26.9	23.1	ug/L	15
Dibromochloromethane		11.17.93	93223	15.9	18.1	ug/L	13
Ethylbenzene		11.17.93	93223	18.3	18.4	ug/L	0
Methyl ethyl ketone		11.17.93	93223	10.6	15.4	ug/L	37 Q
Methyl isobutyl ketone		11.17.93	93223	7.23	11.3	ug/L	44 Q
Methylene chloride		11.17.93	93223	20.2	18.7	ug/L	8
Styrene		11.17.93	93223	19.1	19.4	ug/L	2
Trichloroethene		11.17.93	93223	36.0	36.7	ug/L	2
Toluene		11.17.93	93223	18.5	18.6	ug/L	0
Tetrachloroethene		11.17.93	93223	20.6	20.8	ug/L	1
Vinyl acetate		11.17.93	93223	12.9	14.4	ug/L	11
Vinyl chloride		11.17.93	93223	25.0	22.2	ug/L	12
Total Xylene Isomers		11.17.93	93223	48.6	48.7	ug/L	0
cis-1,3-Dichloropropene		11.17.93	93223	16.8	17.9	ug/L	6
trans-1,2-Dichloroethene		11.17.93	93223	19.7	17.9	ug/L	10
trans-1,3-Dichloropropene		11.17.93	93223	11.7	13.4	ug/L	13
1,2-Dichloroethane-d4 Reported		11.17.93	93223	41.0	42.7	ug/L	4
1,2-Dichloroethane-d4 Theo.		11.17.93	93223	50.0	50.0	ug/L	0
4-Bromofluorobenzene Reported		11.17.93	93223	43.2	44.0	ug/L	2
4-Bromofluorobenzene Theo.		11.17.93	93223	50.0	50.0	ug/L	0
Toluene-d8 Reported		11.17.93	93223	50.8	51.2	ug/L	1
Toluene-d8 Theo.		11.17.93	93223	50.0	50.0	ug/L	0
26. Sulfate (EPA 375.4)	9311138*1						
Date Analyzed		11.18.93	9364	11/18/93	11/18/93	Date	N/A
Sulfate (375.4)		11.18.93	9364	142	144	mg/L	1
Alkalinity (310.1)	9311164*8						
bicarbonate Alk (as CaCO3)		11.23.93	9350	1170	1170	mg/L	0

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 3

MATRIX QC PRECISION (DUPLICATE SPIKES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	MS RESULT	MSD RESULT	UNIT	RELATIVE % DIFF
Total Alkalinity (as CaCO ₃)		11.23.93	9350	1170	1170	mg/L	0

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 1

MATRIX QC ACCURACY (SPIKES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	MS %	MSD %	TRUE RESULT	UNIT
1. TRPH/CADHS/418.1	9311164*2	11.24.93	93189	84	88	5.35	mg/L
2. Vol.Pri.Pol. (EPA 8260	9311164*1						
1,1-Dichloroethene		11.16.93	93812	97	102	50.0	ug/L
Benzene		11.16.93	93812	88	99	50.0	ug/L
Chlorobenzene		11.16.93	93812	106	113	50.0	ug/L
Trichloroethene		11.16.93	93812	92	95	50.0	ug/L
Toluene		11.16.93	93812	99	106	50.0	ug/L
3. Alkalinity (310.1)	9311117*10						
Bicarbonate Alk (as CaCO ₃)		11.22.93	9349	104	104	472	mg/L
Total Alkalinity (as CaCO ₃)		11.22.93	9349	104	104	472	mg/L
4. Calcium (6010)	9311164*2	11.19.93	931613	104	96	103	mg/L
5. Magnesium (6010)	9311164*2	11.19.93	931613	99	95	67.0	mg/L
6. Chloride (325.3)	9311138*1	11.17.93	9375	95	97	50.0	mg/L
7. Copper (6010)	9311128*1	11.19.93	931613	81	89	0.610	mg/L
8. Copper (6010)	9311164*2	11.19.93	931613	96	95	0.500	mg/L
9. Surfactants, MBAS	9311152*1	11.11.93	93104	108	81	24.0	mg/L
10. Iron (6010)	9311164*2	11.19.93	931613	447 Q	427 Q	0.84	mg/L
11. Manganese (6010)	9311164*2	11.19.93	931613	NC	NC	0.400	mg/L
12. Potassium (6010)	9311164*2	11.19.93	931613	99	94	15.2	mg/L
13. Sodium (6010)	9311164*2	11.20.93	931613	NC	NC	960	mg/L
14. Sulfate (375.4)	9311073*1	11.14.93	9363	101	99	34.0	mg/L
15. Filterable Residue	9311164*2	11.18.93	93106	96	89	4300	mg/L
16. Zinc (6010)	9311128*1	11.19.93	931613	90	96	0.640	mg/L
17. Zinc (6010)	9311164*2	11.19.93	931613	100	99	0.527	mg/L
18. Nitrate (353.2)	9311138*1						
Nitrate (as NO ₃)		11.17.93	93328	70	72	4.0	mg/L
19. Nitrate (353.2)	9311155*3						
Nitrate (as N)		11.17.93	93328	59 Q	69	1.78	mg/L
Nitrate (as NO ₃)		11.17.93	93328	59 Q	69	7.90	mg/L
20. Aluminum (6010)	9311164*2	11.19.93	931613	135 Q	165 Q	1.00	mg/L
21. Fluoride (340.2)	9311138*1	11.16.93	9350	105	99	1.43	mg/L
22. Filterable Residue	9311138*3	11.16.93	93104	98	99	4400	mg/L
23. Vol.Pri.Pol. (EPA 8260	9311150*1						
1,1,1-Trichloroethane		11.17.93	93223	84	76	20.0	ug/L
1,1,2,2-Tetrachloroethane		11.17.93	93223	67	87	20.0	ug/L
1,1,2-Trichloroethane		11.17.93	93223	84	101	20.0	ug/L
1,1-Dichloroethane		11.17.93	93223	99	91	20.0	ug/L
1,1-Dichloroethene		11.17.93	93223	104	90	20.0	ug/L
1,2-Dichloroethane		11.17.93	93223	74	83	20.0	ug/L
1,2-Dichloropropane		11.17.93	93223	89	96	20.0	ug/L
2-Hexanone		11.17.93	93223	47	83	20.0	ug/L
Acetone		11.17.93	93223	87	116	20.0	ug/L
Bromodichloromethane		11.17.93	93223	76	82	20.0	ug/L
Chloromethane		11.17.93	93223	120	114	20.0	ug/L
Toluene		11.17.93	93223	93	94	20.0	ug/L

BC ANALYTICAL
ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 2

MATRIX QC ACCURACY (SPIKES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	MS %	MSD %	TRUE RESULT	UNIT
Bromoform		11.17.93	93223	77	93	20.0	ug/L
Chlorobenzene		11.17.93	93223	95	95	20.0	ug/L
Carbon Tetrachloride		11.17.93	93223	86	76	20.0	ug/L
Chloroethane		11.17.93	93223	119	109	20.0	ug/L
Chloroform		11.17.93	93223	88	81	20.0	ug/L
Chloromethane		11.17.93	93223	111	104	20.0	ug/L
Carbon Disulfide		11.17.93	93223	134 Q	115	20.0	ug/L
Dibromochloromethane		11.17.93	93223	79	90	20.0	ug/L
Ethylbenzene		11.17.93	93223	91	92	20.0	ug/L
Methyl ethyl ketone		11.17.93	93223	53	77	20.0	ug/L
Methyl isobutyl ketone		11.17.93	93223	36 Q	56	20.0	ug/L
Methylene chloride		11.17.93	93223	101	93	20.0	ug/L
Styrene		11.17.93	93223	95	97	20.0	ug/L
Trichloroethene		11.17.93	93223	98	101	36.4	ug/L
Toluene		11.17.93	93223	92	93	20.0	ug/L
Tetrachloroethene		11.17.93	93223	103	104	20.0	ug/L
Vinyl acetate		11.17.93	93223	64	72	20.0	ug/L
Vinyl chloride		11.17.93	93223	125	111	20.0	ug/L
Total Xylene Isomers		11.17.93	93223	81	81	60.0	ug/L
cis-1,3-Dichloropropene		11.17.93	93223	84	89	20.0	ug/L
trans-1,2-Dichloroethene		11.17.93	93223	98	89	20.0	ug/L
trans-1,3-Dichloropropene		11.17.93	93223	58	67	20.0	ug/L
1,2-Dichloroethane-d4 Reported		11.17.93	93223	82	85	50.0	ug/L
1,2-Dichloroethane-d4 Theo.		11.17.93	93223	100	100	50.0	ug/L
4-Bromofluorobenzene Reported		11.17.93	93223	86	88	50.0	ug/L
4-Bromofluorobenzene Theo.		11.17.93	93223	100	100	50.0	ug/L
Toluene-d8 Reported		11.17.93	93223	102	102	50.0	ug/L
Toluene-d8 Theo.		11.17.93	93223	100	100	50.0	ug/L
24. Sulfate (375.4) 9311138*1		11.18.93	9364	92	94	150	mg/L
25. Alkalinity (310.1) 9311164*8							
Bicarbonate Alk (as CaCO ₃)		11.23.93	9350	100	100	1170	mg/L
Total Alkalinity (as CaCO ₃)		11.23.93	9350	100	100	1170	mg/L

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 1

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER		DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
1. TRPH/CADHS/418.1	B3111836*1	11.24.93	93189	0	0.5	mg/L	418.1
2. TPH (8015M)	B3111661*1						
Date Analyzed		11.16.93	93125	11/16/93	NA	Date	8015M
Date Extracted		11.16.93	93125	11/15/93	NA	Date	8015M
TPH (diesel)		11.16.93	93125	0	0.1	mg/L	8015M
TPH (gasoline)		11.16.93	93125	0	NA	mg/L	8015M
TPH (total)		11.16.93	93125	0	1	mg/L	8015M
3. Vol.Pri.Pol. (EPA 8260	B3111275*1						
Date Analyzed		11.16.93	93812	11/16/93	NA	Date	8240
1,1,1-Trichloroethane		11.16.93	93812	0	1	ug/L	8240
1,1,2,2-Tetrachloroethane		11.16.93	93812	0.80	1	ug/L	8240
1,1,2-Trichloroethane		11.16.93	93812	0	1	ug/L	8240
1,1-Dichloroethane		11.16.93	93812	0	1	ug/L	8240
1,1-Dichloroethene		11.16.93	93812	0	1	ug/L	8240
1,2-Dichloroethane		11.16.93	93812	0	1	ug/L	8240
1,2-Dichlorobenzene		11.16.93	93812	0	1	ug/L	8240
1,2-Dichloropropane		11.16.93	93812	0	1	ug/L	8240
3-Dichlorobenzene		11.16.93	93812	0	1	ug/L	8240
4-Dichlorobenzene		11.16.93	93812	0	1	ug/L	8240
2-Chloroethylvinylether		11.16.93	93812	0	1	ug/L	8240
2-Hexanone		11.16.93	93812	0	5	ug/L	8240
Acetone		11.16.93	93812	0	20	ug/L	8240
Acrolein		11.16.93	93812	0	50	ug/L	8240
Acrylonitrile		11.16.93	93812	0	50	ug/L	8240
Bromodichloromethane		11.16.93	93812	0	1	ug/L	8240
Bromomethane		11.16.93	93812	0	1	ug/L	8240
Benzene		11.16.93	93812	0	1	ug/L	8240
Bromoform		11.16.93	93812	0	1	ug/L	8240
Chlorobenzene		11.16.93	93812	0	1	ug/L	8240
Carbon Tetrachloride		11.16.93	93812	0	1	ug/L	8240
Chloroethane		11.16.93	93812	0	1	ug/L	8240
Chloroform		11.16.93	93812	0	1	ug/L	8240
Chloromethane		11.16.93	93812	0	1	ug/L	8240
Carbon Disulfide		11.16.93	93812	0	2	ug/L	8240
Dibromochloromethane		11.16.93	93812	0	1	ug/L	8240
Ethylbenzene		11.16.93	93812	0	1	ug/L	8240
Freon 113		11.16.93	93812	0	2	ug/L	8240
Methyl ethyl ketone		11.16.93	93812	0	5	ug/L	8240
Methyl isobutyl ketone		11.16.93	93812	0	5	ug/L	8240
Methylene chloride		11.16.93	93812	0	1	ug/L	8240
Styrene		11.16.93	93812	0	1	ug/L	8240
Trichloroethene		11.16.93	93812	0	1	ug/L	8240
Trichlorofluoromethane		11.16.93	93812	0	1	ug/L	8240
Toluene		11.16.93	93812	0	1	ug/L	8240
Trachloroethene		11.16.93	93812	0	1	ug/L	8240

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 2

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER		DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
Vinyl acetate		11.16.93	93812	0	10	ug/L	8240
Vinyl chloride		11.16.93	93812	0	1	ug/L	8240
Total Xylene Isomers		11.16.93	93812	0	3	ug/L	8240
cis-1,2-Dichloroethene		11.16.93	93812	0	1	ug/L	8240
cis-1,3-Dichloropropene		11.16.93	93812	0	1	ug/L	8240
trans-1,2-Dichloroethene		11.16.93	93812	0	1	ug/L	8240
trans-1,3-Dichloropropene		11.16.93	93812	0	1	ug/L	8240
4. Alkalinity (310.1)	B311624*1						
Carbonate Alk (as CaCO ₃)		11.22.93	9349	<1	1	mg/L	310.1
Bicarbonate Alk (as CaCO ₃)		11.22.93	9349	0	10	mg/L	310.1
Hydroxide Alk (as CaCO ₃)		11.22.93	9349	<1	1	mg/L	310.1
Total Alkalinity (as CaCO ₃)		11.22.93	9349	0	10	mg/L	310.1
5. Calcium (6010)	B3111426*1	11.19.93	931613	0.22	0.5	mg/L	6010
6. Magnesium (6010)	B3111433*1	11.19.93	931613	0.03	0.1	mg/L	6010
7. Chloride (325.3)	B3111855*1	11.17.93	9375	0	0.5	mg/L	325.3
8. Copper (6010)	B310573*1	11.19.93	931613	0.005	0.02	mg/L	6010
9. Surfactants, MBAS	B3111883*1	11.11.93	93104	0	0.1	mg/L	425.1
10. Iron (6010)	B3111192*1	11.19.93	931613	0.033	0.04	mg/L	6010
11. Iron (6010)	B31111362*1	11.19.93	931613	0.033	0.04	mg/L	6010
12. Manganese (6010)	B31111363*1	11.19.93	931613	0.003	0.01	mg/L	6010
13. Potassium (6010)	B31111432*1	11.19.93	931613	0.14	0.5	mg/L	6010
14. Sodium (6010)	B31111199*1	11.19.93	931613	0.37	0.5	mg/L	6010
15. Sulfate (375.4)	B3111886*1	11.14.93	9363	0	2	mg/L	375.4
16. Filterable Residue	B31111569*1	11.18.93	93106	7	10	mg/L	160.1
17. Zinc (6010)	B310282*1	11.19.93	931613	0.009	0.01	mg/L	6010
18. Nitrate (EPA 353.2)	B3111757*1						
Date Analyzed		11.17.93	93328	11/17/93	NA	Date	353.2
Nitrate (as N)		11.17.93	93328	0	0.05	mg/L	353.2
Nitrate (as NO ₃)		11.17.93	93328	0	0.2	mg/L	353.2
19. Nitrate (353.2)	B3111826*1						
Nitrate (as N)		11.17.93	93328	0	0.05	mg/L	353.2
Nitrate (as NO ₃)		11.17.93	93328	0	0.2	mg/L	353.2
20. Digestion (3010)	B31111295*1	11.18.93	931613	11/18/93	NA	Date	3010
21. Aluminum (6010)	B31111425*1	11.19.93	931613	0.03	0.1	mg/L	6010
22. Fluoride (EPA 340.2)	B3111654*1						
Date Analyzed		11.16.93	9350	11/16/93	NA	Date	340.2
Fluoride (340.2)		11.16.93	9350	0.017	0.05	mg/L	340.2
23. Filterable Residue	B3111622*1	11.16.93	93104	2	10	mg/L	160.1
24. TDS (EPA 160.1)	B31111277*1						
Date Analyzed		11.16.93	93104	11/16/93	NA	Date	160.1
Filterable Residue, TDS (160.1)		11.16.93	93104	2	10	mg/L	160.1
25. EPA 8240 VOCs	B31111279*1						
Date Analyzed		11.17.93	93223	11/17/93	NA	Date	8240
1,1,1-Trichloroethane		11.17.93	93223	0	1	ug/L	8240
1,1,2,2-Tetrachloroethane		11.17.93	93223	0.42	1	ug/L	8240

BC ANALYTICAL

ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 3

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
1,1,2-Trichloroethane	11.17.93	93223	0	1	ug/L	8240
1,1-Dichloroethane	11.17.93	93223	0	1	ug/L	8240
1,1-Dichloroethene	11.17.93	93223	0	1	ug/L	8240
1,2-Dichloroethane	11.17.93	93223	0	1	ug/L	8240
1,2-Dichloropropane	11.17.93	93223	0	1	ug/L	8240
2-Chloroethylvinylether	11.17.93	93223	0	1	ug/L	8240
2-Hexanone	11.17.93	93223	0	5	ug/L	8240
Acetone	11.17.93	93223	4.3	20	ug/L	8240
Bromodichloromethane	11.17.93	93223	0	1	ug/L	8240
Bromomethane	11.17.93	93223	0	1	ug/L	8240
Benzene	11.17.93	93223	0	1	ug/L	8240
Bromoform	11.17.93	93223	0	1	ug/L	8240
Chlorobenzene	11.17.93	93223	0	1	ug/L	8240
Carbon Tetrachloride	11.17.93	93223	0	1	ug/L	8240
Chloroethane	11.17.93	93223	0	1	ug/L	8240
Chloroform	11.17.93	93223	0	1	ug/L	8240
Chloromethane	11.17.93	93223	0	1	ug/L	8240
Carbon Disulfide	11.17.93	93223	0	2	ug/L	8240
Bromochloromethane	11.17.93	93223	0	1	ug/L	8240
Ethylbenzene	11.17.93	93223	0.11	1	ug/L	8240
Methyl ethyl ketone	11.17.93	93223	0	5	ug/L	8240
Methyl isobutyl ketone	11.17.93	93223	0	5	ug/L	8240
Methylene chloride	11.17.93	93223	0	1	ug/L	8240
Styrene	11.17.93	93223	0	1	ug/L	8240
Trichloroethene	11.17.93	93223	0	1	ug/L	8240
Toluene	11.17.93	93223	0	1	ug/L	8240
Tetrachloroethene	11.17.93	93223	0	1	ug/L	8240
Vinyl acetate	11.17.93	93223	0	10	ug/L	8240
Vinyl chloride	11.17.93	93223	0	1	ug/L	8240
Total Xylene Isomers	11.17.93	93223	0	3	ug/L	8240
cis-1,2-Dichloroethene	11.17.93	93223	0	1	ug/L	8240
cis-1,3-Dichloropropene	11.17.93	93223	0	1	ug/L	8240
trans-1,2-Dichloroethene	11.17.93	93223	0	1	ug/L	8240
trans-1,3-Dichloropropene	11.17.93	93223	0	1	ug/L	8240
1,2-Dichloroethane-d4 Reported	11.17.93	93223	40.1	5	ug/L	8240
1,2-Dichloroethane-d4 Theo.	11.17.93	93223	50.0	NA	ug/L	8240
4-Bromofluorobenzene Reported	11.17.93	93223	42.6	Q 5	ug/L	8240
4-Bromofluorobenzene Theo.	11.17.93	93223	50.0	NA	ug/L	8240
Toluene-d8 Reported	11.17.93	93223	49.4	5	ug/L	8240
Toluene-d8 Theo.	11.17.93	93223	50.0	NA	ug/L	8240
26. Sulfate (EPA 375.4)	B3111285*1					
Date Analyzed		11.18.93	9364	11/18/93	NA	Date
Sulfate (375.4)		11.18.93	9364	0	100	mg/L
Alkalinity (310.1)	B3111091*1					375.4
Carbonate Alk (as CaCO ₃)		11.23.93	9350	<1	1	mg/L
						310.1

Q

BC ANALYTICAL
ORDER QC REPORT FOR G9311164

DATE REPORTED : 12/16/93

Page 4

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
Bicarbonate Alk (as CaCO ₃)	11.23.93	9350	0	10	mg/L	310.1
Hydroxide Alk (as CaCO ₃)	11.23.93	9350	<1	1	mg/L	310.1
Total Alkalinity (as CaCO ₃)	11.23.93	9350	0	10	mg/L	310.1

PREP BATCH REPORT: FLAME

16 DEC PREP BATCH # _____ PREP INITS _____

1	9312083*1	AQ LAW.CRANDALL	20 DEC	AL	CA	CU FE K MG MN	NA
2	9312083*2	AQ LAW.CRANDALL	20 DEC	AL	CA	CU FE K MG MN	NA
3	=> 9312094*1	WW METRO.RAIL	20 DEC	AG	BA BE	CD CO CR CU	MO NI SB T
4	9312150*10	AQ ENVIRON.IR	17 DEC	AG	BE	CD CR CU	NI SB T
5	9312150*11	AQ ENVIRON.IR	17 DEC	AG	BE	CD CR CU	NI SB T
6	9312150*12	AQ ENVIRON.IR	17 DEC	AG	BE	CD CR CU	NI SB T
7	9312150*13	AQ ENVIRON.IR	17 DEC	AG	BE	CD CR CU	NI SB T
8	9312150*14	AQ ENVIRON.IR	17 DEC	AG	BE	CD CR CU	NI SB T
9	9312150*15	AQ ENVIRON.IR	17 DEC	AG	BE	CD CR CU	NI SB T
10	9312168*3	GW ENVIRON.IR	17 DEC	AG	BE	CR CU	NI SB T
11	9312168*4	GW ENVIRON.IR	17 DEC	AG	BE	CR CU	NI SB T
12	9312168*5	GW ENVIRON.IR	17 DEC	AG	BE	CR CU	NI SB T
13	9312168*6	GW ENVIRON.IR	17 DEC	AG	BE	CR CU	NI SB T
14	9312168*7	GW ENVIRON.IR	17 DEC	AG	BE	CR CU	NI SB T
15	9312168*8	GW ENVIRON.IR	17 DEC	AG	BE	CR CU	NI SB T
16	9312168*9	GW ENVIRON.IR	17 DEC	AG	BE	CR CU	NI SB T
17	9312168*10	GW ENVIRON.IR	17 DEC	AG	BE	CR CU	NI SB T

>> GLENDALE LAB - 15:41:01 16 DEC 1993 >>

PREP BATCH REPORT: GFA

16 DEC PREP BATCH #		PREP INITS			
1	9312083*1	AQ LAW.CRANDALL	20 DEC	< NO	PERTINENT WORK >
2	9312083*2	AQ LAW.CRANDALL	20 DEC	< NO	PERTINENT WORK >
3	9312094*1	WW METRO.RAIL	20 DEC	PB	
4	9312150*10	AQ ENVIRON.IR	17 DEC	AS	PB SE
5	9312150*11	AQ ENVIRON.IR	17 DEC	AS	PB SE
6	9312150*12	AQ ENVIRON.IR	17 DEC	AS	PB SE
7	9312150*13	AQ ENVIRON.IR	17 DEC	AS	PB SE
8	9312150*14	AQ ENVIRON.IR	17 DEC	AS	PB SE
9	9312150*15	AQ ENVIRON.IR	17 DEC	AS	PB SE
10	=> 9312168*3	GW ENVIRON.IR	17 DEC	AS CD PB SE	
11	=> 9312168*4	GW ENVIRON.IR	17 DEC	AS CD PB SE	
12	=> 9312168*5	GW ENVIRON.IR	17 DEC	AS CD PB SE	
13	=> 9312168*6	GW ENVIRON.IR	17 DEC	AS CD PB SE	
14	=> 9312168*7	GW ENVIRON.IR	17 DEC	AS CD PB SE	
15	=> 9312168*8	GW ENVIRON.IR	17 DEC	AS CD PB SE	
16	=> 9312168*9	GW ENVIRON.IR	17 DEC	AS CD PB SE	
17	=> 9312168*10	GW ENVIRON.IR	17 DEC	AS CD PB SE	



Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

CHAIN OF CUSTODY FORM

Job Number: 24246.2.3

Name/Location: TEXACO WALKER

Project Manager: RACHEL MARTINEZ

Samplers: KAREN WITZKE

JUAN FAUSTO

Recorder: Karen W. Johnson
(Signature Required)

Lab: BC

G93C1-164

ANALYSIS REQUESTED	
EPA 601/8010	X
EPA 602/8020	X
EPA 624/8240	X
EPA 625/8270	X
Priority Pltnmt. Metals	X
Benzene/Toluene/Xylene	X
Total Petrol. Hydrocarb.	X
Gasoline 81-40% RON	X
Gasoline 91% RON	X
Gasoline 91% MON	X
Cetane 3%	X
Cetane mix 40% Nitro	X
HIP. 12 L	X

LAB NUMBER			DEPTH IN FEET	COL MTD	QA CODE	MISCELLANEOUS	CHAIN OF CUSTODY RECORD		
Yr	Wk	Seq					RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
							<i>Karen McNease</i>	<i>T. Lark</i>	11-10-93/32
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
							<i>T. Lark</i>	<i>Susan Newkirk</i>	4.30
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
							DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)
METHOD OF SHIPMENT									

DETERMINATION OF SOIL MOISTURE AND DENSITY

PROJ. NAME:	HCA		PROJ. #:			DATE: 6-15-94
LOCATION:	(HCA # 24246 - 2.1)		TESTED BY:	Hill		CHECKED BY:
BORING NO.						
SAMPLE NO.	LS-15	LS-15	LS-16	LS-16		
DEPTH	5'-5-6.0	10'-5-11.0	15'-15.5	75'-5-76'		
Sample I.D.			i. 910"			
Sample Length	4.528	6.000	5.800	6.000		
W. OF WET SOIL+RING	922.7	1034.1	761.7	940.2		
WEIGHT OF WET SOIL	715.5	926.9	584.6	763.0		
WET DENSITY (PCF)	1.61.9	1.69.0	1.66.9	1.67.0		
DRY DENSITY (PCF)	1.16.1	1.24.5	1.24.3	1.24.0		
			1.72.1			
MOISTURE CALCULATION						
TARE NO.						
W. OF WET SOIL+TARE	166.8	445.7	284.2	445.0		
W. OF DRY SOIL+TARE	143.6	434.2	270.9	438.3		
WEIGHT OF TARE	14.4	114.9	116.2	115.9		
WEIGHT OF WATER	18.2	11.5	13.3	6.7		
WEIGHT OF DRY SOIL	134.2	319.3	154.7	222.4		
WATER CONTENT (%)	13.6	3.6	8.6	3.0		
SOIL CLASSIFICATION AND REMARKS						
CLASSIFICATION (SP. SW. SM. ML. MH. CL. CH. ETC.)	Moist, Stiff, grayed brown clayey sand (SC)	Gr-1	Moist, dense, dark gray, silty sand (SM)	Light, gray, Med. grain (CL)		
REMARKS	yellowish brown sandy grained					

Note: 1) Weight of Ring is 45 g. 2) Volume of Soil in a Ring is 2.65×10^{-3} ft.³



BING YEN & ASSOCIATES, INC.
Geotechnical & Environmental Consultants, Established 1979

Sheet 2 of 3

DETERMINATION OF SOIL MOISTURE AND DENSITY

PROJ. NAME:	HLA		PROJ. #:	DATE: 6-15-94		
LOCATION:	(HLA # K4246 - 2.3)			TESTED BY:	HVL	
BORING NO.						
SAMPLE NO.	RS-12	RS-12	RS-13	RS-13	RS-14	RS-14
DEPTH	10'-5"-11'	11'-0"-11'	11'-5"-12.0	15'-5"-16.0	5'-0"-5.5	18'-0"-25.5
Sample I.D.						
Sample Length	4.71	6.000	5.996	5.750	5.750	5.907
W. OF WET SOIL+RING	997.1	1061.5	1084.3	985.3	1074.8	1098.8
WEIGHT OF WET SOIL	789.9	854.3	877.1	698.1	867.6	891.6
WET DENSITY (PCF)	140.0	118.9	122.1	101.4	126.0	124.1
DRY DENSITY (PCF)	122.8	103.7	107.8	98.9	110.8	115.9
MOISTURE CALCULATION						
TARE NO.						
W. OF WET SOIL+TARE	267.7	189.8	169.8	176.2	193.6	241.5
W. OF DRY SOIL+TARE	147.5	167.4	119.8	172.1	172.0	219.7
WEIGHT OF TARE	102.9	14.2	14.3	14.3	14.2	14.1
WEIGHT OF WATER	20.2	22.4	14.0	3.9	21.6	29.3
WEIGHT OF DRY SOIL	144.6	153.2	105.5	158.0	157.8	199.1
WATER CONTENT (%)	14.0	14.6	13.3	2.5	13.7	7.1
SOIL CLASSIFICATION AND REMARKS						
CLASSIFICATION (SP. SW. SM. ML. MH. CL. CH. ETC.)	Wet, Med. Stiff, dark gray, sandy clay - bl.	Wet, Med. Stiff, bl. gray, clayey sand	Wet, Stiff, dark loamy grayish brown clayey sand to sandy clay.	Wet, yellowish brown fine to Med. Sand (sp)	Wet, Stiff, hard gray clayey sand (sc)	lt. gray half vertically Med. to coarse sand (sp) lt. gray sandy clay, ccl
REMARKS						

Note: 1) Weight of Ring is 45 g. 2) Volume of Soil in a Ring is 2.65×10^{-3} ft.³



BING YEN & ASSOCIATES, INC.
Geotechnical & Environmental Consultants, Established 1979

DETERMINATION OF SOIL MOISTURE AND DENSITY

PROJ. NAME:	HCA		PROJ. #:			DATE: 6-15-94
LOCATION:	(HCA # HCA06-2.3)		TESTED BY:	HVK		CHECKED BY:
BORING NO.						
SAMPLE NO.	LS-17	LS-17	LS-9	LS-9	LS-10	LS-10
DEPTH	1.5-11.0	45.0-45.5	4.5-5.0	44.5-55.0	10-10.5	20.0-20.5
Sample I.D.	2.410"					
Sample Length	5.750	5.750	6.000	6.000	5.500	5.947
W. OF WET SOIL+RING	1141.3	882.9	1087.0	983.2	921.7	1006.2
WEIGHT OF WET SOIL	934.1	675.7	879.8	776.0	715.5	799.0
WET DENSITY (PCF)	135.6	98.1	122.4	108.0	108.6	111.2
DRY DENSITY (PCF)	160.2	95.1	105.0	103.0	95.5	99.8
Average wt. of ring	107.2					
MOISTURE CALCULATION						
TARE NO.						
W. OF WET SOIL+TARE	168.7	169.7	188.6	188.1	161.7	165.7
W. OF DRY SOIL+TARE	153.4	146.5	166.7	142.6	146.4	143.4
WEIGHT OF TARE	14.3	14.8	25.0	24.7	24.4	22.9
WEIGHT OF WATER	15.3	9.2	21.9	8.5	15.3	22.9
WEIGHT OF DRY SOIL	119.1	101.7	131.7	177.9	118.0	143.5
WATER CONTENT (%)	16.8	3.1	16.6	4.8	13.7	11.5
SOIL CLASSIFICATION AND REMARKS						
CLASSIFICATION (SP. SW. SM. ML. MH. CL. CH. ETC.)	Wet, Stiff, dark brown clayey sand to sandy clay (sp)		Med. stiff, dark gray (fine) sandy clay - cl		Wet, Med. stiff, brown (fine) sandy clay - cl	
REMARKS	Med. dense, light gray fine to med. gray fine sand		Med. stiff, dark gray clay		Med. dense, light gray sand (sp)	
Note: 1) Weight of Ring is 45 g. 2) Volume of Soil in a Ring is 2.65e-3 ft. ³						



BING YEN & ASSOCIATES, INC.
Geotechnical & Environmental Consultants, Established 1979



Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

CHAIN OF CUSTODY FORM

Samplers: Karen Witbaard

Lab: BYA
Matt Hunter

Job Number: 24246 - 2.3

Name/Location: Texaco Walker - Santa Fe Springs

Project Manager: Rachel Martinez

Recorder: Rachel Martinez
(Signature Required)

(Signature Required)



Ward Law Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

438 1253

CHAIN OF CUSTODY FORM

Samplers: Karen Witbaard

Lab 1

By A
Matt Hunter

Job Number: 24246-2.3

Name/Location: Teraco Walker - Santa Fe Springs

Project Manager: Rachel Martinez

Recorder: Rachel Martinez
(Signature Required)

SOURCE CODE	MATRIX		#CONTAINERS & PRESERV.		SAMPLE NUMBER OR LAB NUMBER		DATE		STATION DESCRIPTION/ NOTES		EPA 601/8010 EPA 602/8020 EPA 624/8240 EPA 625/8270 Priority Plnt. Benzene/Toluene Total Petrol. Hg		Hazardous Preserv.					
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Tube	Yr	Wk	Seq	Yr	Mo	Dy	Time			
																RS12 10.5-11 ML		
																RS12 21-21.5 SC		
																RS13 1.5-2 SM		
																RS13 15.5-16 SP		
																RS14 5-5.5 ML		
																RS14 25-25.5 SM		
																RS15 5.5-6		
																RS15 30.5-31		
																RS16 15-15.5		
																RS16 75.5-76 SP		

APPENDIX G

APPENDIX G
AIR ANALYTICAL RESULTS



PHONE (714) 751-3210 FAX (714) 751-6414

2960 AIRWAY AVENUE, SUITE B-101 COSTA MESA, CALIFORNIA 92626

AAI RFS# : 93-235-01

September 28, 1993

Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project Name: Texaco Walker
Project # : 24246-2.2

Attention: Rachel Martinez

Apollo Analytics Inc., has received the following sample(s) :

<u>Date Received</u>	<u>Quantity</u>	<u>Matrix</u>
August 23-27, 1993	24	Air/Tedlar bag
	23	Air/PUF Cartridge
	23	Air/Filter

The samples received were analyzed for sulfides, semi-volatile organics by GC/MS using EPA TO-13, volatile organics by GC/MS using EPA TO-14, polychlorinated biphenyls by EPA TO-4, and metals by flame atomic absorption.

The project narrative, analytical results, and the quality control data are enclosed. Please see the attached sheet for the sample cross reference table. The symbol for "less than" indicates a value below the reportable detection limit. If you have any questions please do not hesitate to call.


Leon Levan
Laboratory Manager

SAMPLE CROSS REFERENCE

Page 1

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

AAI #	Client Description	Matrix	Date Collected
9323501-001	PUF-1-1	Air/PUF Cartridge	08/20/93
9323501-002	FF-1-1	Air/Filter	08/20/93
9323501-003	IAS-1-1	Air/Tedlar Bag	08/20/93
9323501-004	PUF-2-1	Air/PUF Cartridge	08/20/93
9323501-005	FF-2-1	Air/Filter	08/20/93
9323501-006	IAS-2-1	Air/Tedlar Bag	08/20/93
9323501-007	PUF-3-1	Air/PUF Cartridge	08/20/93
9323501-008	FF-3-1	Air/Filter	08/20/93
9323501-009	IAS-3-1	Air/Tedlar Bag	08/20/93
9323501-010	TRIP #1 (FF)	Air/Filter	08/20/93
9323501-011	TRIP #1 (PUF)	Air/PUF Cartridge	08/20/93
9323501-012	PUF-1-2	Air/PUF Cartridge	08/21/93
9323501-013	FF-1-2	Air/Filter	08/21/93
9323501-014	IAS-1-2	Air/Tedlar Bag	08/21/93
9323501-015	PUF-2-2	Air/PUF Cartridge	08/21/93
9323501-016	FF-2-2	Air/Filter	08/21/93
9323501-017	IAS-2-2	Air/Tedlar Bag	08/21/93
9323501-018	PUF-3-2	Air/PUF Cartridge	08/21/93
9323501-019	FF-3-2	Air/Filter	08/21/93
9323501-020	IAS-3-2	Air/Tedlar Bag	08/21/93
9323501-021	PUF-1-3	Air/PUF Cartridge	08/22/93
9323501-022	FF-1-3	Air/Filter	08/22/93
9323501-023	IAS-1-3	Air/Tedlar Bag	08/22/93
9323501-024	PUF-2-3	Air/PUF Cartridge	08/22/93
9323501-025	FF-2-3	Air/Filter	08/22/93
9323501-026	IAS-2-3	Air/Tedlar Bag	08/22/93
9323501-027	PUF-3-3	Air/PUF Cartridge	08/22/93
9323501-028	FF-3-3	Air/Filter	08/22/93
9323501-029	IAS-3-3	Air/Tedlar Bag	08/22/93
9323505-001	PUF-1-4	Air/PUF Cartridge	08/23/93
9323505-002	FF-1-4	Air/Filter	08/23/93
9323505-003	IAS-1-4	Air/Tedlar Bag	08/23/93
9323505-004	PUF-2-4	Air/PUF Cartridge	08/23/93
9323505-005	FF-2-4	Air/Filter	08/23/93
9323505-006	IAS-2-4	Air/Tedlar Bag	08/23/93
9323505-007	PUF-3-4	Air/PUF Cartridge	08/23/93
9323505-008	FF-3-4	Air/Filter	08/23/93
9323505-009	IAS-3-4	Air/Tedlar Bag	08/23/93

SAMPLE CROSS REFERENCE

Page 2

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

AAI #	Client Description	Matrix	Date Collected
9323802-001	PUF-1-5	Air/PUF Cartridge	08/24/93
9323802-002	FF-1-5	Air/Filter	08/24/93
9323802-003	IAS-1-5	Air/Tedlar Bag	08/24/93
9323802-004	PUF-2-5	Air/PUF Cartridge	08/24/93
9323802-005	FF-2-5	Air/Filter	08/24/93
9323802-006	IAS-2-5	Air/Tedlar Bag	08/24/93
9323802-007	PUF-3-5	Air/PUF Cartridge	08/24/93
9323802-008	FF-3-5	Air/Filter	08/24/93
9323802-009	IAS-3-5	Air/Tedlar Bag	08/24/93
9323802-010	PUF-1-6	Air/PUF Cartridge	08/25/93
9323802-011	FF-1-6	Air/Filter	08/25/93
9323802-012	IAS-1-6	Air/Tedlar Bag	08/25/93
9323802-013	PUF-2-6	Air/PUF Cartridge	08/25/93
9323802-014	FF-2-6	Air/Filter	08/25/93
9323802-015	IAS-2-6	Air/Tedlar Bag	08/25/93
9323802-016	PUF-3-6	Air/PUF Cartridge	08/25/93
9323802-017	FF-3-6	Air/Filter	08/25/93
9323802-018	IAS-3-6	Air/Tedlar Bag	08/25/93
9323902-001	PUF-1-7	Air/PUF Cartridge	08/26/93
9323902-002	FF-1-7	Air/Filter	08/26/93
9323902-003	IAS-1-7	Air/Tedlar Bag	08/26/93
9323902-004	PUF-2-7	Air/PUF Cartridge	08/26/93
9323902-005	FF-2-7	Air/Filter	08/26/93
9323902-006	IAS-2-7	Air/Tedlar Bag	08/26/93
9323902-007	PUF-3-7	Air/PUF Cartridge	08/26/93
9323902-008	FF-3-7	Air/Filter	08/26/93
9323902-009	IAS-3-7	Air/Tedlar Bag	08/26/93
9323902-010	TRIP #2 (FF)	Air/Filter	08/26/93
9323902-011	TRIP #2 (PUF)	Air/PUF Cartridge	08/26/93
9323903-001	IAS-1-8	Air/Tedlar Bag	08/27/93
9323903-002	IAS-2-8	Air/Tedlar Bag	08/27/93
9323903-003	IAS-3-8	Air/Tedlar Bag	08/27/93

---TOTALS--

<u>Matrix</u>	<u># Samples</u>
Air/Tedlar bag	24
Air/PUF Cartridge	23
Air/Filter	23

PROJECT NARRATIVE

Page 3

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

METALS ANALYSIS BY FLAME AA

1. Introduction

The results for the analysis of twenty-three (23) filters for metals: barium, cadmium, chromium, copper, lead, nickel, and zinc are discussed in the following pages. The filter samples were prepared, digested using the "Draft of the Statement of Work for Analysis of Ambient Air, US EPA", and analyzed by flame atomic absorption. Filters were purchased from Watman Corp. and analyzed for the background of the target metals. The filter batch is considered acceptable if the background of the metals is less than the required detection limits for the project.

2. Filter Digestion and Analysis

Two third of each filter was cut and digested using the acid digestion technique in the "Draft of the Statement of Work for Analysis of Ambient Air, US EPA" and analyzed by flame atomic absorption using multipoint calibration.

3. Filter Spike Analysis

All filter samples were batches into two groups: one method blank and one filter spike and spike duplicate were prepared, digested, and analyzed for each group of samples. The results are reported in this final report.

4. Conclusion

The reported data meets all laboratory QC requirements, except for the barium RPD value (43%) of the first set of MS/MSD. The RPD value exceeded the quality control limit of 30%. The barium RPD value of the second set of MS/MSD was within quality control limits. The cause of the RPD failure is undetermined. If you have any questions or matters which require clarification, please contact Leon Levan directly.

SULFIDES ANALYSIS BY GC/ECD

1. Introduction

The results for the analysis of twenty four (24) air samples collected in tedar bag for sulfur compounds are discussed in the following pages. The air samples were analyzed for hydrogen sulfide, carbonyl sulfide, and methyl mercaptan by gas chromatograph equipped with a flame photometric detector (FPD). The analyses were performed according to CARB Method 16 (modified for tedar bag). The tedar bag samples were analyzed within forty-eight (48) hours from the time of sample receipt.

2. Sample Receipt

Upon receipt of the samples, the tedar bags were checked for possible leak and adequate air volume for the analysis. All collected samples were intact except for sample IAS-2-1 that did not have sufficient volume for the analysis. This fact was immediately notified to the sampler and the project manager.

3. Calibration

A dynamic calibration range of sulfur is determined by the analysis of a five point calibration curve. The primary standards were purchased from Scott Specialty Gas Co. and the working standards were prepared by the static dilution method. The linearity between the calibration levels is considered acceptable if the correlation coefficient of the linear regression of each sulfur compound was greater or equal to 0.995. A continuing calibration, mid point level was analyzed daily before sample analysis.

PROJECT NARRATIVE

Page 4

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

4. Sample Analysis

A 10 ml aliquot of samples is withdrawn from the tedar bag with a gas tight syringe, injected and trapped onto the column at -180° C. The collected sample was then revolatilized on the column for separation and quantitation by the oven temperature program.

5. System Performance Criteria

5.1 System Blank

Before system calibration and sample analysis, a 10 ml aliquot of humid zero air is analyzed by the system under the same analytical conditions as in sample analysis. Analytical systems contaminated with less than the detection limits of the target sulfur compounds are deemed acceptable.

5.2 Calibration Check

A one-point calibration check (mid point) is performed every day on the analytical system to verify the initial calibration. After the calibration check, a zero air blank sample is analyzed to verify that the residual standard is not present. The response factor in the continuing calibration check must be less or equal to 25 % of the response factor from the initial calibration.

5.3 Duplicate Analysis

As part of the laboratory QC, five percent of the samples are analyzed in duplicate to establish the reproducibility of the analysis. The results are reported as part of the final report.

6. Analytical Conditions

Gas Chromatograph: IBM9630

Column: 60M X 0.53 mm ID Restek 502.2

Oven Temp: 55 ° C isothermal

Detector : Flame Photometric (FPD)

Sample size: 10 ml

7. Conclusion

The reported data meets all laboratory QC requirements. However, should there be questions or matters which require clarification, please contact Leon Levan directly.

PROJECT NARRATIVE

Page 5

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

VOLATILE ORGANICS ANALYSIS BY EPA TO-14

1. Introduction

The results for the analysis of twenty four (24) air samples collected in teflon bag for volatile compounds (VOCs) are discussed in the following pages. The air samples were analyzed for forty (40) target VOCs by gas chromatography/mass spectroscopy. The analyses were performed according to EPA Method TO-14 (modified for teflon bag) from the "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", EPA 600/4-84-041, U.S. EPA, Research Triangle Park, NC, April, 1984 and May, 1988. The teflon bag samples were analyzed within forty-eight (48) hours from the time of sample receipt.

2. Sample Receipt

Upon receipt of the samples, the teflon bags were checked for possible leak and adequate air volume for the analysis. All collected samples were intact except for sample IAS-2-1 that did not have sufficient volume for the analysis. This fact was immediately notified to the sampler and the project manager.

3. Calibration

A dynamic calibration range of VOCs is determined by the analysis of five calibration levels, 5, 25, 50, 100, and 200 nanogram levels. The primary standards were purchased from Aldrich Chemical and the working standards were prepared by the static dilution method. The linearity between the calibration levels is considered acceptable if the percent relative standard deviation of the response factor of each compound is less than 30 percent. A continuing calibration, 50 nanogram level was analyzed daily before sample analysis.

4. Sample Analysis

The samples and blanks were analyzed using a Hewlett-Packard model 5971A mass spectrometer. Standards, samples, and blanks were concentrated and introduced to the analytical system using an Entech model 2000 air concentrator. A 500 ml aliquot of samples is collected from the teflon bag and trapped on Cryo-1 trap at -180° C. The collected sample was determined by a mass flow meter under computer control. After the desired sampling volume, the concentrator is stepped into cooling of the Cyro-2 trap at -50° C then automatically advanced to the "Transfer" mode to focus the analyte onto the head of the analytical column. When the "Transfer" mode is completed, the concentrator is stepped automatically to the "Inject" mode to revolatilize the compounds on the column for separation and quantitation.

5. System Performance Criteria

5.1 System Blank

Before system calibration and sample analysis, a 500 ml aliquot of humid zero air is analyzed by the system under the same analytical conditions as in sample analysis. Analytical systems contaminated with less than 0.5 ppbv of the target VOC are acceptable.

5.2 Calibration Check

A one-point calibration check (50 ng) is performed every day on the analytical system to verify the initial calibration. After the calibration check, a zero air blank sample is analyzed to verify that the residual VOC is not present. The response factor in the continuing calibration check must be less or equal to 25 % of the response factor from the initial calibration.

PROJECT NARRATIVE

Page 6

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

5.4 Duplicate Analysis

As part of the laboratory QC, five percent of the samples are analyzed in duplicate to establish the reproducibility of the analysis. The results are reported as part of the final report.

6. Analytical Conditions

6.1 Entech 2000 Concentrator

Line Heater: 180° C
Valve Heater: 180° C
Injector Heater: 140° C
Sampling Time: 10 min.
Cryo-1 Temp: -180° C
Cryo-2 Temp: -50° C
Focuser Temp: -180° C
Transfer Time: 3 min.
Cryo-1 Inject Temp: 220° C
Cryo-2 Inject Temp: 220° C
Focuser Inject Temp: 140 ° C
Inject Time: 3 min.
Mode: 2D- Chromatography

6.2 GC/MS Parameters

Gas Chromatograph: HP 5890 Series II
Column: 60M X 0.32 mm ID RTX-Volatile
Oven Temp: 45 °C @ 3min. / 10 °C per min. / 260 °C
Detectors : Mass Spectrometer in scan mode (35 to 350 amu, 1 scan/sec.)
Sample size: 500 ml

7. Conclusion

The reported data meets all laboratory QC requirements. However, should there be questions or matters which require clarification, please contact Leon Levan directly.

PROJECT NARRATIVE

Page 7

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

SEMI-VOLATILE ORGANICS ANALYSIS BY EPA TO-13 **POLYCHLORINATED BIPHENYLS BY EPA TO-4**

1. Introduction

The results for the analysis of twenty three (23) air samples collected in polyurethane foam (PUF) cartridge for semivolatile compounds (PAHs) and polychlorinated biphenyls (PCBs) are discussed in the following pages. The air samples were analyzed for PAHs by gas chromatography/mass spectroscopy and PCBs by gas chromatograph equipped with an electron capture detector. The analyses were performed according to EPA Method TO-13 and TO-4 from the "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air" , EPA 600/4-84-041, U.S. EPA, Research Triangle Park, NC, April, 1984 and May, 1988. The samples were extracted within seven (7) days from the time of sample receipt.

2. Sample Receipt

Upon receipt of the samples, the PUF cartridges were checked for possible breakage. All collected samples were received intact and under good conditions.

3. Calibration

A dynamic calibration range of PAHs and PCBs is determined by the analysis of five-point calibration curve. The primary standards were purchased from Restek Corp. and the working standards were prepared by dilution of the primary standards into the appropriated levels. The linearity between the calibration levels is considered acceptable if the percent relative standard deviation of the response factor of each compound is less than 30 percent or if the correlation coefficienty of the linear regression of each compound was greater or equal to 0.995. A continuing calibration, mid point level was analyzed daily before sample analysis.

4. Sample Analysis

For PAHs analysis, the samples and blanks were analyzed using a Hewlett-Packard model 5971A mass spectrometer while a gas chromatograph equipped with an electron capture detector (ECD) was used for PCBs analyses.

PROJECT NARRATIVE

Page 8

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

5. Analytical Conditions

5.1 PAHs Analysis

Gas Chromatograph: HP 5890 Series II with HP 7673A autoinjector
Column: 30 M X 0.25 um DB-5 capillary column

Oven Temp: 50 °C @ 2min. / 35 °C per min. / 130 °C
12 °C per min. / 320 °C @ 14 min

Detectors : Mass Spectrometer in scan mode (50 to 500 amu, 1 scan/sec.)

Sample size: 2 ul

5.2 PCBs Analysis

Gas Chromatograph: IBM9630

Column: 30 M X 0.50 um DB-5 capillary column

Oven Temp: 150 °C @ 1min. / 6 °C per min. / 275 °C

Detectors : Electron Capture

Sample size: 2 ul

6. Matrix Spike and Matrix Spike Duplicate

As part of the laboratory QC, two sets of PUF spike and spike duplicate which represent ten percent of the samples are spiked, extracted, and analyzed to establish the recovery and reproducibility of the analysis. The results are reported as part of the final report.

7. Conclusion

The reported data meets all laboratory QC requirements. However, should there be questions or matters which require clarification, please contact Leon Levan directly.

ANALYTICAL SCHEDULE

Page 9

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS #: 93-235-01

Section Number	Analysis	Technique/Description
I	Total Metals	Flame AA
II	Sulfides	GC/FPD
III	Volatile Organics (EPA TO-14)	GC/MS
IV	Semi-volatile Organics (EPA TO-13)	GC/MS
V	Polychlorinated Biphenyls (EPA TO-4)	GC/ECD

ANALYTICAL RESULTS

Page 10

Client : Harding Lawson Associates
Project Name : Texaco Walker
Project# : 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

SECTION I: METALS ANALYSIS

METALS ANALYSIS

AAI RFS #(s): 93-235-01, 93-235-05,
93-238-02, 93-239-02

CLIENT NAME: Harding Lawson Associates

DATE(S) SAMPLED: 08/20-27/93

PROJECT#: 24246-2.2

DATE(S) RECEIVED: 08/23-27/93

PROJECT NAME: Texaco-Walker

DATE(S) ANALYZED: 9/6-8/1993

MATRIX: Filter

METHOD: Metals by Flame AA

AAI ID NUMBER	CLIENT ID	Barium (Ba) (ng/m3)	Nickel (Ni) (ng/m3)	Chromium (Cr) (ng/m3)	Copper (Cu) (ng/m3)	Zinc (Zn) (ng/m3)	Cadmium (Cd) (ng/m3)	Lead (Pb) (ng/m3)
9323501-002	FF-1-1	ND<170	ND<120	ND<75	200	350	25	ND<170
9323501-005	FF-2-1	ND<170	ND<120	ND<75	80	210	25	ND<170
9323501-008	FF-3-1	ND<170	ND<120	140	460	420	22	ND<170
9323501-010	TRIP #1 (FF)	ND<170	ND<120	ND<75	ND<12	ND<147	ND<18	ND<170
9323501-013	FF-1-2	ND<170	ND<120	160	280	340	38	ND<170
9323501-016	FF-2-2	ND<170	480	570	670	1400	190	ND<170
9323501-019	FF-3-2	ND<170	ND<120	140	300	300	33	ND<170
9323501-022	FF-1-3	ND<170	ND<120	110	260	300	43	ND<170
9323501-025	FF-2-3	ND<170	ND<120	120	140	310	34	ND<170
9323501-028	FF-3-3	ND<170	ND<120	100	180	460	48	ND<170
9323505-002	FF-1-4	ND<170	ND<120	140	330	540	47	ND<170
9323505-005	FF-2-4	ND<170	200	140	93	430	22	ND<170
9323505-008	FF-3-4	ND<170	220	110	170	380	27	ND<170
9323802-002	FF-1-5	ND<170	230	96	250	700	25	ND<170
9323802-005	FF-2-5	ND<170	210	96	180	480	29	ND<170
9323802-008	FF-3-5	ND<170	390	200	97	310	12	ND<170
9323802-011	FF-1-6	ND<170	220	92	380	510	32	ND<170
9323802-014	FF-2-6	ND<170	430	48	280	440	37	ND<170
9323802-017	FF-3-6	ND<170	220	96	330	710	35	ND<170
9323902-002	FF-1-7	180	240	40	350	510	33	ND<170
9323902-005	FF-2-7	ND<170	250	45	140	410	35	ND<170
9323902-008	FF-3-7	ND<170	250	47	230	490	38	ND<170
9323902-010	TRIP #2 (FF)	ND<170	ND<120	ND<75	ND<12	ND<147	ND<18	ND<170
Method Blank	-----	ND<170	ND<120	ND<75	ND<12	ND<147	ND<18	ND<170
Reagent Blank	-----	ND<170	ND<120	ND<75	ND<12	ND<147	ND<18	ND<170

ANALYTICAL RESULTS

Page 11

Client: Harding Lawson Associates
Project Name: Texaco Walker
Project#: 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

SECTION II: SULFIDES ANALYSIS

SULFIDES ANALYSIS

AAI RFS #(s): 93-235-01, 93-235-05,
93-238-02, 93-239-02

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag

DATE(S) SAMPLED: 08/20-27/93
DATE(S) RECEIVED: 08/23-27/93
DATE(S) ANALYZED: 08/24-28/93
METHOD: CARB 16

AAI ID NUMBER	CLIENT ID	Hydrogen Sulfide (ug/m3)	Carbonyl Sulfide (ug/m3)	Methylmercaptan (ug/m3)
9323501-003	IAS-1-1	ND < 70	ND < 130	ND < 100
9323501-009	IAS-3-1	ND < 70	ND < 130	ND < 100
9323501-014	IAS-1-2	ND < 70	ND < 130	ND < 100
9323501-017	IAS-2-2	ND < 70	ND < 130	ND < 100
9323501-020	IAS-3-2	ND < 70	ND < 130	ND < 100
9323501-023	IAS-1-3	ND < 70	ND < 130	ND < 100
9323501-026	IAS-2-3	ND < 70	ND < 130	ND < 100
9323501-029	IAS-3-3	ND < 70	ND < 130	ND < 100
9323505-003	IAS-1-4	ND < 70	ND < 130	ND < 100
9323505-006	IAS-2-4	ND < 70	ND < 130	ND < 100
9323505-009	IAS-3-4	ND < 70	ND < 130	ND < 100
9323802-003	IAS-1-5	ND < 70	ND < 130	ND < 100
9323802-006	IAS-2-5	ND < 70	ND < 130	ND < 100
9323802-009	IAS-3-5	ND < 70	ND < 130	ND < 100
9323802-012	IAS-1-6	ND < 70	ND < 130	ND < 100
9323802-015	IAS-2-6	ND < 70	ND < 130	ND < 100
9323802-018	IAS-3-6	ND < 70	ND < 130	ND < 100
9323902-003	IAS-1-7	ND < 70	ND < 130	ND < 100
9323902-006	IAS-2-7	ND < 70	ND < 130	ND < 100
9323902-009	IAS-3-7	ND < 70	ND < 130	ND < 100
9323903-001	IAS-1-8	ND < 70	ND < 130	ND < 100
9323903-002	IAS-2-8	ND < 70	ND < 130	ND < 100
9323903-003	IAS-3-8	ND < 70	ND < 130	ND < 100
Method Blank	-----	ND < 70	ND < 130	ND < 100

ANALYTICAL RESULTS

Page 12

Client: Harding Lawson Associates
Project Name: Texaco Walker
Project #: 24246-2.2

Report Date: September 28, 1993
AAI RFS #: 93-235-01

SECTION III: EPA TO-14 ANALYSIS

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-1
AAI RFS# 93-235-01
AAI ID#: 9323501-003

DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	12	11	3.4	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	17	5	3.1	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	20	5	6.2	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	93	5	25	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	12	5	2.9	1.2
1330-20-7	m,p-Xylene	28	5	6.4	1.2
95-47-6	o-Xylene	17	5	4.0	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	19	5	3.9	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	67	6	28	2.5
78-93-3	2-Butanone	10	5	3.4	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-3-1
AAI RFS# 93-235-01
AAI ID#: 9323501-009

DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	POL	ppb(v)	POL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	11	5	2.0	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	34	5	10.6	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	162	5	43	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	18	5	4.3	1.2
1330-20-7	m,p-Xylene	45	5	10.3	1.2
95-47-6	o-Xylene	21	5	4.8	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	10	5	2.1	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	46	6	20	2.5
78-93-3	2-Butanone	7	5	2.3	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND - Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-2
AAI RFS# 93-235-01
AAI ID#: 9323501-014

DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	10	5	1.8	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	12	5	3.7	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropene	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	46	5	12	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.6	1.2
1330-20-7	m,p-Xylene	16	5	3.6	1.2
95-47-6	o-Xylene	10	5	2.3	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	11	5	2.2	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	39	6	16	2.5
78-93-3	2-Butanone	7	5	2.4	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-2-2
AAI RFS# 93-235-01
AAI ID#: 9323501-017

DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	9	5	1.6	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	16	5	4.9	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	54	5	14	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.6	1.2
1330-20-7	m,p-Xylene	17	5	3.9	1.2
95-47-6	o-Xylene	9	5	2.2	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	9	5	1.9	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	28	6	12	2.5
78-93-3	2-Butanone	5	5	1.7	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-3-2
AAI RFS# 93-235-01
AAI ID#: 9323501-020

DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	18	5	3.3	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	14	5	4.3	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	54	5	14	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.6	1.2
1330-20-7	m,p-Xylene	18	5	4.0	1.2
95-47-6	o-Xylene	10	5	2.2	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	10	5	2.1	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	27	6	11	2.5
78-93-3	2-Butanone	5	5	1.8	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-3
AAI RFS# 93-235-01
AAI ID#: 9323501-023

DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	ND <	5	ND <	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	10	5	3.2	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	35	5	9	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	ND <	5	ND <	1.2
1330-20-7	m,p-Xylene	11	5	2.5	1.2
95-47-6	o-Xylene	6	5	1.5	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachlorethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	7	5	1.4	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	39	6	16	2.5
78-93-3	2-Butanone	6	5	2.1	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-2-3
AAI RFS# 93-235-01
AAI ID#: 9323501-026

DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			POL
		ug/m3	PQL	ppb(v)	
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	9	5	1.6	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	14	5	4.3	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	57	5	15	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	8	5	1.8	1.2
1330-20-7	m,p-Xylene	19	5	4.3	1.2
95-47-6	o-Xylene	10	5	2.3	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	9	5	1.9	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	34	6	15	2.5
78-93-3	2-Butanone	6	5	2.0	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-3-3
AAI RFS# 93-235-01
AAI ID#: 9323501-029

DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	15	5	2.8	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	13	5	4.1	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	53	5	14	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.7	1.2
1330-20-7	m,p-Xylene	18	5	4.0	1.2
95-47-6	o-Xylene	10	5	2.2	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachlorethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	10	5	2.0	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	34	6	14	2.5
78-93-3	2-Butanone	6	5	2.1	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-4
AAI RFS# 93-235-05
AAI ID#: 9323505-003

DATE SAMPLED: 8/23/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	13	5	2.4	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	12	5	3.8	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	40	5	11	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.5	1.2
1330-20-7	m,p-Xylene	14	5	3.3	1.2
95-47-6	o-Xylene	9	5	2.1	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	10	5	2.1	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	35	6	15	2.5
78-93-3	2-Butanone	6	5	2.1	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-2-4
AAI RFS# 93-235-05
AAI ID#: 9323505-006

DATE SAMPLED: 8/23/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	13	5	2.4	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	18	5	5.6	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	53	5	14	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.7	1.2
1330-20-7	m,p-Xylene	16	5	3.7	1.2
95-47-6	o-Xylene	10	5	2.4	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachlorethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	11	5	2.2	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	31	6	13	2.5
78-93-3	2-Butanone	6	5	1.9	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-3-4
AAI RFS# 93-235-05
AAI ID#: 9323505-009

DATE SAMPLED: 8/23/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	17	5	3.1	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	14	5	4.3	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	55	5	15	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	8	5	1.9	1.2
1330-20-7	m,p-Xylene	19	5	4.4	1.2
95-47-6	o-Xylene	11	5	2.5	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	12	5	2.4	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	30	6	12	2.5
78-93-3	2-Butanone	6	5	2.2	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-5
AAI RFS# 93-238-02
AAI ID#: 9323802-003

DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE ANALYZED: 8/26/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	16	5	2.9	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	15	5	4.8	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	52	5	14	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.5	1.2
1330-20-7	m,p-Xylene	16	5	3.6	1.2
95-47-6	o-Xylene	9	5	2.0	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	8	5	1.7	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	49	6	21	2.5
78-93-3	2-Butanone	8	5	2.6	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-2-5
AAI RFS# 93-238-02
AAI ID#: 9323802-006

DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE ANALYZED: 8/26/93

ANALYTICAL METHOD: EPA T014 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	22	5	4.1	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	15	5	4.7	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropene	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	57	5	15	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.7	1.2
1330-20-7	m,p-Xylene	18	5	4.2	1.2
95-47-6	o-Xylene	10	5	2.3	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	9	5	1.7	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	42	6	18	2.5
78-93-3	2-Butanone	8	5	2.6	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-3-5
AAI RFS# 93-238-02
AAI ID#: 9323802-009
DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE ANALYZED: 8/26/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	27	5	5.0	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	14	5	4.4	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	56	5	15	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	8	5	1.8	1.2
1330-20-7	m,p-Xylene	19	5	4.3	1.2
95-47-6	o-Xylene	10	5	2.4	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachlorethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	10	5	2.1	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	38	6	16	2.5
78-93-3	2-Butanone	7	5	2.5	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected
TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-6
AAI RFS# 93-238-02
AAI ID#: 9323802-012
DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE ANALYZED: 8/26/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	23	5	4.2	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	16	5	5.2	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropene	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	57	5	15	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-13-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	9	5	2.0	1.2
1330-20-7	m,p-Xylene	19	5	4.3	1.2
95-47-6	o-Xylene	12	5	2.7	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	12	5	2.4	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	59	6	25	2.5
78-93-3	2-Butanone	10	5	3.3	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-2-6
AAI RFS# 93-238-02
AAI ID#: 9323802-015

DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE ANALYZED: 8/26/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION		
		ug/m3	PQL	ppb(v)
74-87-3	Chloromethane	ND <	5	ND <
74-83-9	Bromomethane	ND <	5	ND <
75-01-04	Vinyl Chloride	ND <	5	ND <
75-00-3	Chloroethane	ND <	5	ND <
75-69-4	Freon 11	ND <	5	ND <
75-35-4	1,1-Dichloroethene	ND <	5	ND <
76-13-1	Freon 113	ND <	5	ND <
75-09-2	Methylene Chloride	ND <	11	ND <
75-35-3	1,1-Dichloroethane	ND <	5	ND <
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <
67-66-3	Chloroform	ND <	5	ND <
71-55-6	1,1,1-Trichloroethane	25	5	4.6
56-23-5	Carbon Tetrachloride	ND <	5	ND <
71-43-2	Benzene	17	5	5.4
107-06-2	1,2-Dichloroethane	ND <	5	ND <
79-01-6	Trichloroethene	ND <	5	ND <
78-87-5	1,2-Dichloropropane	ND <	5	ND <
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <
108-88-3	Toluene	69	5	18
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <
127-18-4	Tetrachloroethene	ND <	5	ND <
106-93-4	Ethylene Dibromide	ND <	5	ND <
108-90-7	Chlorobenzene	ND <	5	ND <
100-41-4	Ethylbenzene	9	5	2.0
1330-20-7	m,p-Xylene	21	5	4.8
95-47-6	o-Xylene	11	5	2.6
100-42-5	Styrene	ND <	5	ND <
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <
95-63-6	1,2,4-Trimethyl Benzene	10	5	2.1
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <
100-44-7	Chlorotoluene	ND <	5	ND <
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <
67-64-1	Acetone	40	6	17
78-93-3	2-Butanone	8	5	2.9
108-10-1	4-methyl-2-pentanone	ND <	5	ND <
591-78-6	2-Hexanone	ND <	5	ND <

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-3-6
AAI RFS# 93-238-02
AAI ID#: 9323802-018

DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE ANALYZED: 8/26/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	12	11	3.5	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	12	5	2.2	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	10	5	3.2	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	43	5	11	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	6	5	1.4	1.2
1330-20-7	m,p-Xylene	15	5	3.3	1.2
95-47-6	o-Xylene	9	5	2.0	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachlorethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	8	5	1.6	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	29	6	12	2.5
78-93-3	2-Butanone	ND <	5	ND <	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND - Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-7
AAI RFS# 93-239-02
AAI ID#: 9323902-003

DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	17	5	3.0	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	15	5	4.7	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	56	5	15	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	8	5	1.8	1.2
1330-20-7	m,p-Xylene	18	5	4.0	1.2
95-47-6	o-Xylene	10	5	2.4	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	10	5	2.1	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	41	6	17	2.5
78-93-3	2-Butanone	9	5	3.0	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-2-7
AAI RFS# 93-239-02
AAI ID#: 9323902-006

DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	14	5	2.5	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	6	5	1.9	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropene	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	23	5	6	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	ND <	5	ND <	1.2
1330-20-7	m,p-Xylene	8	5	1.8	1.2
95-47-6	o-Xylene	ND <	5	ND <	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachlorethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	5	5	1.0	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	26	6	11	2.5
78-93-3	2-Butanone	5	5	1.7	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-3-7
AAI RFS# 93-239-02
AAI ID#: 9323902-009

DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	17	5	3.1	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	14	5	4.5	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	57	5	15	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	8	5	1.8	1.2
1330-20-7	m,p-Xylene	19	5	4.3	1.2
95-47-6	o-Xylene	10	5	2.3	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	9	5	1.9	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	33	6	14	2.5
78-93-3	2-Butanone	6	5	2.2	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-8
AAI RFS# 93-239-03
AAI ID#: 9323903-001

DATE SAMPLED: 8/27/93
DATE RECEIVED: 8/27/93
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	7	5	1.4	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	12	5	3.9	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	40	5	11	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	6	5	1.3	1.2
1330-20-7	m,p-Xylene	12	5	2.7	1.2
95-47-6	o-Xylene	7	5	1.7	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	8	5	1.6	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	34	6	14	2.5
78-93-3	2-Butanone	ND <	5	ND <	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-2-8
AAI RFS# 93-239-03
AAI ID#: 9323903-002

DATE SAMPLED: 8/27/93
DATE RECEIVED: 8/27/93
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	10	5	1.8	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	13	5	4.0	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropene	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	37	5	10	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	ND <	5	ND <	1.2
1330-20-7	m,p-Xylene	10	5	2.4	1.2
95-47-6	o-Xylene	6	5	1.4	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	6	5	1.3	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	18	6	7	2.5
78-93-3	2-Butanone	ND <	5	ND <	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-3-B
AAI RFS# 93-239-03
AAI ID#: 9323903-003

DATE SAMPLED: 8/27/93
DATE RECEIVED: 8/27/93
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	8	5	1.4	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	5	5	1.7	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	20	5	5	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethybenzene	ND <	5	ND <	1.2
1330-20-7	m,p-Xylene	6	5	1.4	1.2
95-47-6	o-Xylene	ND <	5	ND <	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	5	5	1.0	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	15	6	6	2.5
78-93-3	2-Butanone	ND <	5	ND <	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-1
AAI RFS# 93-235-01
AAI ID#: 9323501-001 DUP

DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	12	11	3.3	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	16	5	3.0	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	19	5	5.9	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	92	5	24	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	12	5	2.8	1.2
1330-20-7	m,p-Xylene	27	5	6.2	1.2
95-47-6	o-Xylene	17	5	3.9	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	18	5	3.7	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	62	6	26	2.5
78-93-3	2-Butanone	10	5	3.3	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-5
AAI RFS# 93-238-02
AAI ID#: 9323802-003 DUP

DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE ANALYZED: 8/26/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	15	5	2.8	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	15	5	4.7	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	52	5	14	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	7	5	1.5	1.2
1330-20-7	m,p-Xylene	15	5	3.5	1.2
95-47-6	o-Xylene	8	5	1.9	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	8	5	1.6	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	47	6	20	2.5
78-93-3	2-Butanone	7	5	2.5	1.7
108-10-1	4-methyl-2-pentenone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: IAS-1-7
AAI RFS# 93-239-02
AAI ID#: 9323902-003 **DUP**

DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	16	5	2.9	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	15	5	4.5	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	54	5	14	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	8	5	1.8	1.2
1330-20-7	m,p-Xylene	17	5	3.9	1.2
95-47-6	o-Xylene	10	5	2.3	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	10	5	2.0	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	39	6	17	2.5
78-93-3	2-Butanone	8	5	2.8	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: Method Blank
AAI RFS# 93-235-01
AAI ID#: method blank

DATE SAMPLED: NA
DATE RECEIVED: NA
DATE ANALYZED: 8/23/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	ND <	5	ND <	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	ND <	5	ND <	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	ND <	5	ND <	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	ND <	5	ND <	1.2
1330-20-7	m,p-Xylene	ND <	5	ND <	1.2
95-47-6	o-Xylene	ND <	5	ND <	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	ND <	5	ND <	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	ND <	6	ND <	2.5
78-93-3	2-Butanone	ND <	5	ND <	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: Method Blank
AAI RFS# 93-238-02
AAI ID#: method blank

DATE SAMPLED: NA
DATE RECEIVED: NA
DATE ANALYZED: 8/26/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	PQL
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	ND <	5	ND <	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	ND <	5	ND <	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	ND <	5	ND <	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	ND <	5	ND <	1.2
1330-20-7	m,p-Xylene	ND <	5	ND <	1.2
95-47-6	o-Xylene	ND <	5	ND <	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachlorethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	ND <	5	ND <	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	ND <	6	ND <	2.5
78-93-3	2-Butanone	ND <	5	ND <	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND - Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: Method Blank
AAI RFS# 93-239-02
AAI ID#: Method Blank
DATE SAMPLED: NA
DATE RECEIVED: NA
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			
		ug/m3	PQL	ppb(v)	
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	ND <	5	ND <	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	ND <	5	ND <	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	ND <	5	ND <	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	ND <	5	ND <	1.2
1330-20-7	m,p-Xylene	ND <	5	ND <	1.2
95-47-6	o-Xylene	ND <	5	ND <	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	ND <	5	ND <	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	ND <	6	ND <	2.5
78-93-3	2-Butanone	ND <	5	ND <	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

VOLATILE ORGANIC ANALYSIS

CLIENT NAME: Herding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: Air/Tedlar Bag
SAMPLE VOLUME: 0.5 Liter
INITIAL PRESSURE: 1.00 psia
FINAL PRESSURE: 1.00 psia
PRES. DILUTION : 1.00
DILUTION FACTOR: 1

CLIENT SAMPLE ID: Method Blank
AAI RFS# 93-239-03
AAI ID#: method blank

DATE SAMPLED: NA
DATE RECEIVED: NA
DATE ANALYZED: 8/28/93

ANALYTICAL METHOD: EPA TO14 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION			PQL
		ug/m3	PQL	ppb(v)	
74-87-3	Chloromethane	ND <	5	ND <	2.4
74-83-9	Bromomethane	ND <	5	ND <	1.3
75-01-04	Vinyl Chloride	ND <	5	ND <	2.0
75-00-3	Chloroethane	ND <	5	ND <	1.9
75-69-4	Freon 11	ND <	5	ND <	0.9
75-35-4	1,1-Dichloroethene	ND <	5	ND <	1.3
76-13-1	Freon 113	ND <	5	ND <	0.7
75-09-2	Methylene Chloride	ND <	11	ND <	3.2
75-35-3	1,1-Dichloroethane	ND <	5	ND <	1.2
156-60-5	trans-1,2-Dichloroethene	ND <	5	ND <	1.3
156-59-2	cis-1,2-Dichloroethene	ND <	5	ND <	1.3
67-66-3	Chloroform	ND <	5	ND <	1.0
71-55-6	1,1,1-Trichloroethane	ND <	5	ND <	0.9
56-23-5	Carbon Tetrachloride	ND <	5	ND <	0.8
71-43-2	Benzene	ND <	5	ND <	1.6
107-06-2	1,2-Dichloroethane	ND <	5	ND <	1.2
79-01-6	Trichloroethene	ND <	5	ND <	0.9
78-87-5	1,2-Dichloropropane	ND <	5	ND <	1.1
10061-02-6	trans-1,3-Dichloropropene	ND <	5	ND <	1.1
108-88-3	Toluene	ND <	5	ND <	1.3
10061-01-5	cis-1,3-Dichloropropene	ND <	5	ND <	1.1
79-00-5	1,1,2-Trichloroethane	ND <	5	ND <	0.9
127-18-4	Tetrachloroethene	ND <	5	ND <	0.7
106-93-4	Ethylene Dibromide	ND <	5	ND <	0.7
108-90-7	Chlorobenzene	ND <	5	ND <	1.1
100-41-4	Ethylbenzene	ND <	5	ND <	1.2
1330-20-7	m,p-Xylene	ND <	5	ND <	1.2
95-47-6	o-Xylene	ND <	5	ND <	1.2
100-42-5	Styrene	ND <	5	ND <	1.2
79-34-5	1,1,2,2-Tetrachloroethane	ND <	5	ND <	0.7
108-67-8	1,3,5-Trimethyl Benzene	ND <	5	ND <	1.0
95-63-6	1,2,4-Trimethyl Benzene	ND <	5	ND <	1.0
541-73-1	1,3-Dichlorobenzene	ND <	5	ND <	0.8
106-46-7	1,4-Dichlorobenzene	ND <	5	ND <	0.8
100-44-7	Chlorotoluene	ND <	5	ND <	1.0
95-50-1	1,2-Dichlorobenzene	ND <	5	ND <	0.8
67-64-1	Acetone	ND <	6	ND <	2.5
78-93-3	2-Butanone	ND <	5	ND <	1.7
108-10-1	4-methyl-2-pentanone	ND <	5	ND <	1.2
591-78-6	2-Hexanone	ND <	5	ND <	1.2

ND- Not detected

TR - Trace

ANALYTICAL RESULTS

Page 13

Client: Harding Lawson Associates
Project Name: Texaco Walker
Project#: 24246-2.2

Report Date: September 28, 1993
AAI RFS #: 93-235-01

SECTION IV: EPA TO-13 ANALYSIS

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 97 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-1-1
AAI RFS #: 93-235-01
AAI Sample #: 9323501-001
DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31/09/02/93
DATE ANALYZED: 09/05/07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 52	52
83-32-9	Acenaphthene	ND < 52	52
208-96-8	Acenaphthylene	ND < 52	52
86-73-7	Fluorene	ND < 52	52
85-01-8	Phenanthrene	ND < 52	52
20-12-7	Anthracene	ND < 52	52
206-44-0	Fluoranthene	ND < 52	52
129-00-0	Pyrene	ND < 52	52
56-55-3	Benzo(a)anthracene	ND < 52	52
218-01-9	Chrysene	ND < 52	52
205-99-2	Benzo(b)fluoranthene	ND < 52	52
207-08-9	Benzo(k)fluoranthene	ND < 52	52
50-32-8	Benzo(a)pyrene	ND < 52	52
53-70-3	Dibenz(a,h)anthracene	ND < 52	52
191-24-2	Benzo(g,h,i)perylene	ND < 52	52
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 52	52

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 197 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-2-1
AAI RFS #: 93-235-01
AAI Sample #: 9323501-004
DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 25	25
83-32-9	Acenaphthene	ND < 25	25
208-96-8	Acenaphthylene	ND < 25	25
86-73-7	Fluorene	ND < 25	25
85-01-8	Phenanthrene	ND < 25	25
20-12-7	Anthracene	ND < 25	25
206-44-0	Fluoranthene	ND < 25	25
129-00-0	Pyrene	ND < 25	25
56-55-3	Benzo(a)anthracene	ND < 25	25
218-01-9	Chrysene	ND < 25	25
205-99-2	Benzo(b)fluoranthene	ND < 25	25
207-08-9	Benzo(k)fluoranthene	ND < 25	25
50-32-8	Benzo(a)pyrene	ND < 25	25
53-70-3	Dibenzo(a,h)anthracene	ND < 25	25
191-24-2	Benzo(g,h,i)perylene	ND < 25	25
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 25	25

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 107 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-3-1
AAI RFS #: 93-235-01
AAI Sample #: 9323501-007
DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m³	PQL
91-20-3	Naphthalene	ND < 47	47
83-32-9	Acenaphthene	ND < 47	47
208-96-8	Acenaphthylene	ND < 47	47
86-73-7	Fluorene	ND < 47	47
85-01-8	Phenanthrene	ND < 47	47
20-12-7	Anthracene	ND < 47	47
206-44-0	Fluoranthene	ND < 47	47
129-00-0	Pyrene	ND < 47	47
56-55-3	Benzo(a)anthracene	ND < 47	47
218-01-9	Chrysene	ND < 47	47
205-99-2	Benzo(b)fluoranthene	ND < 47	47
207-08-9	Benzo(k)fluoranthene	ND < 47	47
50-32-8	Benzo(a)pyrene	ND < 47	47
53-70-3	Dibenzo(a,h)anthracene	ND < 47	47
191-24-2	Benzo(g,h,i)perylene	ND < 47	47
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 47	47

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 100 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: TRIP #1 (PUF)
AAI RFS #: 93-235-01
AAI Sample #: 9323501-011
DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31/93-09/02/93
DATE ANALYZED: 09/05/93-07/93
METHOD: EPA-TO13 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 50	50
83-32-9	Acenaphthene	ND < 50	50
208-96-8	Acenaphthylene	ND < 50	50
86-73-7	Fluorene	ND < 50	50
85-01-8	Phenanthrene	ND < 50	50
20-12-7	Anthracene	ND < 50	50
206-44-0	Fluoranthene	ND < 50	50
129-00-0	Pyrene	ND < 50	50
56-55-3	Benzo(a)anthracene	ND < 50	50
218-01-9	Chrysene	ND < 50	50
205-99-2	Benzo(b)fluoranthene	ND < 50	50
207-08-9	Benzo(k)fluoranthene	ND < 50	50
50-32-8	Benzo(a)pyrene	ND < 50	50
53-70-3	Dibenz(a,h)anthracene	ND < 50	50
191-24-2	Benzo(g,h,i)perylene	ND < 50	50
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 50	50

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 100 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-1-2
AAI RFS #: 93-235-01
AAI Sample #: 9323501-012
DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO13 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 50	50
83-32-9	Acenaphthene	ND < 50	50
208-96-8	Acenaphthylene	ND < 50	50
86-73-7	Fluorene	ND < 50	50
85-01-8	Phenanthrene	ND < 50	50
20-12-7	Anthracene	ND < 50	50
206-44-0	Fluoranthene	ND < 50	50
129-00-0	Pyrene	ND < 50	50
56-55-3	Benzo(a)anthracene	ND < 50	50
218-01-9	Chrysene	ND < 50	50
205-99-2	Benzo(b)fluoranthene	ND < 50	50
207-08-9	Benzo(k)fluoranthene	ND < 50	50
50-32-8	Benzo(a)pyrene	ND < 50	50
53-70-3	Dibenzo(a,h)anthracene	ND < 50	50
191-24-2	Benzo(g,h,i)perylene	ND < 50	50
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 50	50

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 24 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-2-2
AAI RFS #: 93-235-01
AAI Sample #: 9323501-015
DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 208	208
83-32-9	Acenaphthene	ND < 208	208
208-96-8	Acenaphthylene	ND < 208	208
86-73-7	Fluorene	ND < 208	208
85-01-8	Phenanthrene	ND < 208	208
20-12-7	Anthracene	ND < 208	208
206-44-0	Fluoranthene	ND < 208	208
129-00-0	Pyrene	ND < 208	208
56-55-3	Benzo(a)anthracene	ND < 208	208
218-01-9	Chrysene	ND < 208	208
205-99-2	Benzo(b)fluoranthene	ND < 208	208
207-08-9	Benzo(k)fluoranthene	ND < 208	208
50-32-8	Benzo(a)pyrene	ND < 208	208
53-70-3	Dibenzo(a,h)anthracene	ND < 208	208
191-24-2	Benzo(g,h,i)perylene	ND < 208	208
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 208	208

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 109 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-3-2
AAI RFS #: 93-235-01
AAI Sample #: 9323501-018
DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31/09/02/93
DATE ANALYZED: 09/05/07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 46	46
83-32-9	Acenaphthene	ND < 46	46
208-96-8	Acenaphthylene	ND < 46	46
86-73-7	Fluorene	ND < 46	46
85-01-8	Phenanthrene	75	46
20-12-7	Anthracene	ND < 46	46
206-44-0	Fluoranthene	ND < 46	46
129-00-0	Pyrene	ND < 46	46
56-55-3	Benzo(a)anthracene	ND < 46	46
218-01-9	Chrysene	ND < 46	46
205-99-2	Benzo(b)fluoranthene	ND < 46	46
207-08-9	Benzo(k)fluoranthene	ND < 46	46
50-32-8	Benzo(a)pyrene	ND < 46	46
53-70-3	Dibenzo(a,h)anthracene	ND < 46	46
191-24-2	Benzo(g,h,i)perylene	ND < 46	46
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 46	46

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 104 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-1-3
AAI RFS #: 93-235-01
AAI Sample #: 9323501-021
DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
91-20-3	Naphthalene	ND < 48	48
83-32-9	Acenaphthene	ND < 48	48
208-96-8	Acenaphthylene	ND < 48	48
86-73-7	Fluorene	ND < 48	48
85-01-8	Phenanthrene	ND < 48	48
20-12-7	Anthracene	ND < 48	48
206-44-0	Fluoranthene	ND < 48	48
129-00-0	Pyrene	ND < 48	48
56-55-3	Benzo(a)anthracene	ND < 48	48
218-01-9	Chrysene	ND < 48	48
205-99-2	Benzo(b)fluoranthene	ND < 48	48
207-08-9	Benzo(k)fluoranthene	ND < 48	48
50-32-8	Benzo(a)pyrene	ND < 48	48
53-70-3	Dibenzo(a,h)anthracene	ND < 48	48
191-24-2	Benzo(g,h,i)perylene	ND < 48	48
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 48	48

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 108 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-2-3
AAI RFS #: 93-235-01
AAI Sample #: 9323501-024
DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 46	46
83-32-9	Acenaphthene	ND < 46	46
208-96-8	Acenaphthylene	ND < 46	46
86-73-7	Fluorene	ND < 46	46
85-01-8	Phenanthrene	ND < 46	46
20-12-7	Anthracene	ND < 46	46
206-44-0	Fluoranthene	ND < 46	46
129-00-0	Pyrene	ND < 46	46
56-55-3	Benzo(a)anthracene	ND < 46	46
218-01-9	Chrysene	ND < 46	46
205-99-2	Benzo(b)fluoranthene	ND < 46	46
207-08-9	Benzo(k)fluoranthene	ND < 46	46
50-32-8	Benzo(a)pyrene	ND < 46	46
53-70-3	Dibenzo(a,h)anthracene	ND < 46	46
191-24-2	Benzo(g,h,i)perylene	ND < 46	46
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 46	46

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 107 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-3-3
AAI RFS #: 93-235-01
AAI Sample #: 9323501-027
DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 47	47
83-32-9	Acenaphthene	ND < 47	47
208-96-8	Acenaphthylene	ND < 47	47
86-73-7	Fluorene	ND < 47	47
85-01-8	Phenanthrene	ND < 47	47
20-12-7	Anthracene	ND < 47	47
206-44-0	Fluoranthene	ND < 47	47
129-00-0	Pyrene	ND < 47	47
56-55-3	Benzo(a)anthracene	ND < 47	47
218-01-9	Chrysene	ND < 47	47
205-99-2	Benzo(b)fluoranthene	ND < 47	47
207-08-9	Benzo(k)fluoranthene	ND < 47	47
50-32-8	Benzo(a)pyrene	ND < 47	47
53-70-3	Dibenzo(a,h)anthracene	ND < 47	47
191-24-2	Benzo(g,h,i)perylene	ND < 47	47
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 47	47

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 95 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-1-4
AAI RFS #: 93-235-05
AAI Sample #: 9323505-001
DATE SAMPLED: 8/23/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 53	53
83-32-9	Acenaphthene	ND < 53	53
208-96-8	Acenaphthylene	ND < 53	53
86-73-7	Fluorene	ND < 53	53
85-01-8	Phenanthrene	ND < 53	53
20-12-7	Anthracene	ND < 53	53
206-44-0	Fluoranthene	ND < 53	53
129-00-0	Pyrene	ND < 53	53
56-55-3	Benzo(a)anthracene	ND < 53	53
218-01-9	Chrysene	ND < 53	53
205-99-2	Benzo(b)fluoranthene	ND < 53	53
207-08-9	Benzo(k)fluoranthene	ND < 53	53
50-32-8	Benzo(a)pyrene	ND < 53	53
53-70-3	Dibenzo(a,h)anthracene	ND < 53	53
191-24-2	Benzo(g,h,i)perylene	ND < 53	53
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 53	53

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 93 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-2-4
AAI RFS #: 93-235-05
AAI Sample #: 9323505-004
DATE SAMPLED: 8/23/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO13 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
91-20-3	Naphthalene	ND < 54	54
83-32-9	Acenaphthene	ND < 54	54
208-96-8	Acenaphthylene	ND < 54	54
86-73-7	Fluorene	ND < 54	54
85-01-8	Phenanthrene	ND < 54	54
20-12-7	Anthracene	ND < 54	54
206-44-0	Fluoranthene	ND < 54	54
129-00-0	Pyrene	ND < 54	54
56-55-3	Benzo(a)anthracene	ND < 54	54
218-01-9	Chrysene	ND < 54	54
205-99-2	Benzo(b)fluoranthene	ND < 54	54
207-08-9	Benzo(k)fluoranthene	ND < 54	54
50-32-8	Benzo(a)pyrene	ND < 54	54
53-70-3	Dibenzo(a,h)anthracene	ND < 54	54
191-24-2	Benzo(g,h,i)perylene	ND < 54	54
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 54	54

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates

PROJECT #: 24246-2.2

PROJECT NAME: Texaco-Walker

MATRIX: PUF Cartridge

AIR VOLUME 101 m³

DILUTION FACTOR: 2.00

EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-3-4

AAI RFS #: 93-235-05

AAI Sample #: 9323505-007

DATE SAMPLED: 8/23/93

DATE RECEIVED: 8/23/93

DATE EXTRACTED: 08/31/09/02/93

DATE ANALYZED: 09/05/07/93

METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 50	50
83-32-9	Acenaphthene	ND < 50	50
208-96-8	Acenaphthylene	ND < 50	50
86-73-7	Fluorene	ND < 50	50
85-01-8	Phenanthrene	69	50
20-12-7	Anthracene	ND < 50	50
206-44-0	Fluoranthene	ND < 50	50
129-00-0	Pyrene	ND < 50	50
56-55-3	Benzo(a)anthracene	ND < 50	50
218-01-9	Chrysene	ND < 50	50
205-99-2	Benzo(b)fluoranthene	ND < 50	50
207-08-9	Benzo(k)fluoranthene	ND < 50	50
50-32-8	Benzo(a)pyrene	ND < 50	50
53-70-3	Dibenz(a,h)anthracene	ND < 50	50
191-24-2	Benzo(g,h,i)perylene	ND < 50	50
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 50	50

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 99 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-1-5
AAI RFS #: 93-238-02
AAI Sample #: 9323802-001
DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m³	PQL
91-20-3	Naphthalene	ND < 51	51
83-32-9	Acenaphthene	ND < 51	51
208-96-8	Acenaphthylene	ND < 51	51
86-73-7	Fluorene	ND < 51	51
85-01-8	Phenanthrene	ND < 51	51
20-12-7	Anthracene	ND < 51	51
206-44-0	Fluoranthene	ND < 51	51
129-00-0	Pyrene	ND < 51	51
56-55-3	Benzo(a)anthracene	ND < 51	51
218-01-9	Chrysene	ND < 51	51
205-99-2	Benzo(b)fluoranthene	ND < 51	51
207-08-9	Benzo(k)fluoranthene	ND < 51	51
50-32-8	Benzo(a)pyrene	ND < 51	51
53-70-3	Dibenz(a,h)anthracene	ND < 51	51
191-24-2	Benzo(g,h,i)perylene	ND < 51	51
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 51	51

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 109 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-2-5
AAI RFS #: 93-238-02
AAI Sample #: 9323802-004
DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 46	46
83-32-9	Acenaphthene	ND < 46	46
208-96-8	Acenaphthylene	ND < 46	46
86-73-7	Fluorene	ND < 46	46
85-01-8	Phenanthrene	ND < 46	46
20-12-7	Anthracene	ND < 46	46
206-44-0	Fluoranthene	ND < 46	46
129-00-0	Pyrene	ND < 46	46
56-55-3	Benzo(a)anthracene	ND < 46	46
218-01-9	Chrysene	ND < 46	46
205-99-2	Benzo(b)fluoranthene	ND < 46	46
207-08-9	Benzo(k)fluoranthene	ND < 46	46
50-32-8	Benzo(a)pyrene	ND < 46	46
53-70-3	Dibenz(a,h)anthracene	ND < 46	46
191-24-2	Benzo(g,h,i)perylene	ND < 46	46
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 46	46

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 103 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-3-5
AAI RFS #: 93-238-02
AAI Sample #: 9323802-007
DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31/93-09/02/93
DATE ANALYZED: 09/05/93-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 49	49
83-32-9	Acenaphthene	ND < 49	49
208-96-8	Acenaphthylene	ND < 49	49
86-73-7	Fluorene	ND < 49	49
85-01-8	Phenanthrene	60	49
20-12-7	Anthracene	ND < 49	49
206-44-0	Fluoranthene	ND < 49	49
129-00-0	Pyrene	ND < 49	49
56-55-3	Benzo(a)anthracene	ND < 49	49
218-01-9	Chrysene	ND < 49	49
205-99-2	Benzo(b)fluoranthene	ND < 49	49
207-08-9	Benzo(k)fluoranthene	ND < 49	49
50-32-8	Benzo(a)pyrene	ND < 49	49
53-70-3	Dibenzo(a,h)anthracene	ND < 49	49
191-24-2	Benzo(g,h,i)perylene	ND < 49	49
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 49	49

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 98 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-1-6
AAI RFS #: 93-238-02
AAI Sample #: 9323802-010
DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31/09/02/93
DATE ANALYZED: 09/05/07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 51	51
83-32-9	Acenaphthene	ND < 51	51
208-96-8	Acenaphthylene	ND < 51	51
86-73-7	Fluorene	ND < 51	51
85-01-8	Phenanthrene	59	51
20-12-7	Anthracene	ND < 51	51
206-44-0	Fluoranthene	ND < 51	51
129-00-0	Pyrene	ND < 51	51
56-55-3	Benzo(a)anthracene	ND < 51	51
218-01-9	Chrysene	ND < 51	51
205-99-2	Benzo(b)fluoranthene	ND < 51	51
207-08-9	Benzo(k)fluoranthene	ND < 51	51
50-32-8	Benzo(a)pyrene	ND < 51	51
53-70-3	Dibenzo(a,h)anthracene	ND < 51	51
191-24-2	Benzo(g,h,i)perylene	ND < 51	51
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 51	51

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 103 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-2-6
AAI RFS #: 93-238-02
AAI Sample #: 9323802-013
DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 49	49
83-32-9	Acenaphthene	ND < 49	49
208-96-8	Acenaphthylene	ND < 49	49
86-73-7	Fluorene	ND < 49	49
85-01-8	Phenanthrene	ND < 49	49
20-12-7	Anthracene	ND < 49	49
206-44-0	Fluoranthene	ND < 49	49
129-00-0	Pyrene	ND < 49	49
56-55-3	Benzo(a)anthracene	ND < 49	49
218-01-9	Chrysene	ND < 49	49
205-99-2	Benzo(b)fluoranthene	ND < 49	49
207-08-9	Benzo(k)fluoranthene	ND < 49	49
50-32-8	Benzo(a)pyrene	ND < 49	49
53-70-3	Dibenzo(a,h)anthracene	ND < 49	49
191-24-2	Benzo(g,h,i)perylene	ND < 49	49
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 49	49

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 101 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-3-6
AAI RFS #: 93-238-02
AAI Sample #: 9323802-016
DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO13 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 50	50
83-32-9	Acenaphthene	ND < 50	50
208-96-8	Acenaphthylene	ND < 50	50
86-73-7	Fluorene	ND < 50	50
85-01-8	Phenanthrene	ND < 50	50
20-12-7	Anthracene	ND < 50	50
206-44-0	Fluoranthene	ND < 50	50
129-00-0	Pyrene	ND < 50	50
56-55-3	Benzo(a)anthracene	ND < 50	50
218-01-9	Chrysene	ND < 50	50
205-99-2	Benzo(b)fluoranthene	ND < 50	50
207-08-9	Benzo(k)fluoranthene	ND < 50	50
50-32-8	Benzo(a)pyrene	ND < 50	50
53-70-3	Dibenz(a,h)anthracene	ND < 50	50
191-24-2	Benzo(g,h,i)perylene	ND < 50	50
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 50	50

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 101 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-1-7
AAI RFS #: 93-239-02
AAI Sample #: 9323902-001
DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO13 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 50	50
83-32-9	Acenaphthene	ND < 50	50
208-96-8	Acenaphthylene	ND < 50	50
86-73-7	Fluorene	ND < 50	50
85-01-8	Phenanthrene	ND < 50	50
20-12-7	Anthracene	ND < 50	50
206-44-0	Fluoranthene	ND < 50	50
129-00-0	Pyrene	ND < 50	50
56-55-3	Benzo(a)anthracene	ND < 50	50
218-01-9	Chrysene	ND < 50	50
205-99-2	Benzo(b)fluoranthene	ND < 50	50
207-08-9	Benzo(k)fluoranthene	ND < 50	50
50-32-8	Benzo(a)pyrene	ND < 50	50
53-70-3	Dibenzo(a,h)anthracene	ND < 50	50
191-24-2	Benzo(g,h,i)perylene	ND < 50	50
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 50	50

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 105 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-2-7
AAI RFS #: 93-239-02
AAI Sample #: 9323902-004
DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 48	48
83-32-9	Acenaphthene	ND < 48	48
208-96-8	Acenaphthylene	ND < 48	48
86-73-7	Fluorene	ND < 48	48
85-01-8	Phenanthrene	ND < 48	48
20-12-7	Anthracene	ND < 48	48
206-44-0	Fluoranthene	ND < 48	48
129-00-0	Pyrene	ND < 48	48
56-55-3	Benzo(a)anthracene	ND < 48	48
218-01-9	Chrysene	ND < 48	48
205-99-2	Benzo(b)fluoranthene	ND < 48	48
207-08-9	Benzo(k)fluoranthene	ND < 48	48
50-32-8	Benzo(a)pyrene	ND < 48	48
53-70-3	Dibenzo(a,h)anthracene	ND < 48	48
191-24-2	Benzo(g,h,i)perylene	ND < 48	48
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 48	48

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 101 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: PUF-3-7
AAI RFS #: 93-239-02
AAI Sample #: 9323902-007
DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 50	50
83-32-9	Acenaphthene	ND < 50	50
208-96-8	Acenaphthylene	ND < 50	50
86-73-7	Fluorene	ND < 50	50
85-01-8	Phenanthrene	ND < 50	50
20-12-7	Anthracene	ND < 50	50
206-44-0	Fluoranthene	ND < 50	50
129-00-0	Pyrene	ND < 50	50
56-55-3	Benzo(a)anthracene	ND < 50	50
218-01-9	Chrysene	ND < 50	50
205-99-2	Benzo(b)fluoranthene	ND < 50	50
207-08-9	Benzo(k)fluoranthene	ND < 50	50
50-32-8	Benzo(a)pyrene	ND < 50	50
53-70-3	Dibenz(a,h)anthracene	ND < 50	50
191-24-2	Benzo(g,h,i)perylene	ND < 50	50
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 50	50

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 100 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: TRIP #2 (PUF)
AAI RFS #: 93-239-02
AAI Sample #: 9323902-011
DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE EXTRACTED: 08/31/93-09/02/93
DATE ANALYZED: 09/05/93-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 50	50
83-32-9	Acenaphthene	ND < 50	50
208-96-8	Acenaphthylene	ND < 50	50
86-73-7	Fluorene	ND < 50	50
85-01-8	Phenanthrene	ND < 50	50
20-12-7	Anthracene	ND < 50	50
206-44-0	Fluoranthene	ND < 50	50
129-00-0	Pyrene	ND < 50	50
56-55-3	Benzo(a)anthracene	ND < 50	50
218-01-9	Chrysene	ND < 50	50
205-99-2	Benzo(b)fluoranthene	ND < 50	50
207-08-9	Benzo(k)fluoranthene	ND < 50	50
50-32-8	Benzo(a)pyrene	ND < 50	50
53-70-3	Dibenzo(a,h)anthracene	ND < 50	50
191-24-2	Benzo(g,h,i)perylene	ND < 50	50
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 50	50

SEMI-VOLATILE ORGANICS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 100 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 1.00 ml

CLIENT SAMPLE ID: METHOD BLANK
AAI RFS #: 93-235-01
AAI Sample #: Method Blank
DATE SAMPLED: NA
DATE RECEIVED: NA
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T013 (GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
91-20-3	Naphthalene	ND < 50	50
83-32-9	Acenaphthene	ND < 50	50
208-96-8	Acenaphthylene	ND < 50	50
86-73-7	Fluorene	ND < 50	50
85-01-8	Phenanthrene	ND < 50	50
20-12-7	Anthracene	ND < 50	50
206-44-0	Fluoranthene	ND < 50	50
129-00-0	Pyrene	ND < 50	50
56-55-3	Benzo(a)anthracene	ND < 50	50
218-01-9	Chrysene	ND < 50	50
205-99-2	Benzo(b)fluoranthene	ND < 50	50
207-08-9	Benzo(k)fluoranthene	ND < 50	50
50-32-8	Benzo(a)pyrene	ND < 50	50
53-70-3	Dibenzo(a,h)anthracene	ND < 50	50
191-24-2	Benzo(g,h,i)perylene	ND < 50	50
193-39-5	Indeno(1,2,3-cd)pyrene	ND < 50	50

ANALYTICAL RESULTS

Page 14

Client: Harding Lawson Associates
Project Name: Texaco Walker
Project#: 24246-2.2

Report Date: September 28, 1993
AAI RFS # : 93-235-01

SECTION V: EPA TO-4 ANALYSIS

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 97 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-1-1
AAI RFS #: 93-235-01
AAI Sample #: 9323501-001
DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO4(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 6.2	6.2
11104-28-2	Aroclor 1221	ND < 6.2	6.2
11141-16-5	Aroclor 1232	ND < 6.2	6.2
53469-21-9	Aroclor 1242	ND < 6.2	6.2
12672-29-6	Aroclor 1248	ND < 6.2	6.2
11097-69-1	Aroclor 1254	ND < 62	62
11096-82-5	Aroclor 1260	ND < 62	62

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 197 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-2-1
AAI RFS #: 93-235-01
AAI Sample #: 9323501-004
DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 3.0	3.0
11104-28-2	Aroclor 1221	ND < 3.0	3.0
11141-16-5	Aroclor 1232	ND < 3.0	3.0
53469-21-9	Aroclor 1242	ND < 3.0	3.0
12672-29-6	Aroclor 1248	ND < 3.0	3.0
11097-69-1	Aroclor 1254	ND < 30	30
11096-82-5	Aroclor 1260	ND < 30	30

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 107 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-3-1
AAI RFS #: 93-235-01
AAI Sample #: 9323501-007
DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO4(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.6	5.6
11104-28-2	Aroclor 1221	ND < 5.6	5.6
11141-16-5	Aroclor 1232	ND < 5.6	5.6
53469-21-9	Aroclor 1242	ND < 5.6	5.6
12672-29-6	Aroclor 1248	ND < 5.6	5.6
11097-69-1	Aroclor 1254	ND < 56	56
11096-82-5	Aroclor 1260	ND < 56	56

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 100 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: TRIP #1 (PUF)
AAI RFS #: 93-235-01
AAI Sample #: 9323501-011
DATE SAMPLED: 8/20/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 6.0	6.0
11104-28-2	Aroclor 1221	ND < 6.0	6.0
11141-16-5	Aroclor 1232	ND < 6.0	6.0
53469-21-9	Aroclor 1242	ND < 6.0	6.0
12672-29-6	Aroclor 1248	ND < 6.0	6.0
11097-69-1	Aroclor 1254	ND < 60	60
11096-82-5	Aroclor 1260	ND < 60	60

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 100 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-1-2
AAI RFS #: 93-235-01
AAI Sample #: 9323501-012
DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION	
		ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 6.0	6.0
11104-28-2	Aroclor 1221	ND < 6.0	6.0
11141-16-5	Aroclor 1232	ND < 6.0	6.0
53469-21-9	Aroclor 1242	ND < 6.0	6.0
12672-29-6	Aroclor 1248	ND < 6.0	6.0
11097-69-1	Aroclor 1254	ND < 60	60
11096-82-5	Aroclor 1260	ND < 60	60

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 24 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-2-2
AAI RFS #: 93-235-01
AAI Sample #: 9323501-015
DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 25	25
11104-28-2	Aroclor 1221	ND < 25	25
11141-16-5	Aroclor 1232	ND < 25	25
53469-21-9	Aroclor 1242	ND < 25	25
12672-29-6	Aroclor 1248	ND < 25	25
11097-69-1	Aroclor 1254	ND < 250	250
11096-82-5	Aroclor 1260	ND < 250	250

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 109 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-3-2
AAI RFS #: 93-235-01
AAI Sample #: 9323501-018
DATE SAMPLED: 8/21/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31/93-02/93
DATE ANALYZED: 09/05/93-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.5	5.5
11104-28-2	Aroclor 1221	ND < 5.5	5.5
11141-16-5	Aroclor 1232	ND < 5.5	5.5
53469-21-9	Aroclor 1242	ND < 5.5	5.5
12672-29-6	Aroclor 1248	ND < 5.5	5.5
11097-69-1	Aroclor 1254	ND < 55	55
11096-82-5	Aroclor 1260	ND < 55	55

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 104 m3
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-1-3
AAI RFS #: 93-235-01
AAI Sample #: 9323501-021
DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m3	PQL
12674-11-2	Aroclor 1016	ND < 5.8	5.8
11104-28-2	Aroclor 1221	ND < 5.8	5.8
11141-16-5	Aroclor 1232	ND < 5.8	5.8
53469-21-9	Aroclor 1242	ND < 5.8	5.8
12672-29-6	Aroclor 1248	ND < 5.8	5.8
11097-69-1	Aroclor 1254	ND < 58	58
11096-82-5	Aroclor 1260	ND < 58	58

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 108 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-2-3
AAI RFS #: 93-235-01
AAI Sample #: 9323501-024
DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.6	5.6
11104-28-2	Aroclor 1221	ND < 5.6	5.6
11141-16-5	Aroclor 1232	ND < 5.6	5.6
53469-21-9	Aroclor 1242	ND < 5.6	5.6
12672-29-6	Aroclor 1248	ND < 5.6	5.6
11097-69-1	Aroclor 1254	ND < 56	56
11096-82-5	Aroclor 1260	ND < 56	56

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Welker
MATRIX: PUF Cartridge
AIR VOLUME 107 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-3-3
AAI RFS #: 93-235-01
AAI Sample #: 9323501-027
DATE SAMPLED: 8/22/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.6	5.6
11104-28-2	Aroclor 1221	ND < 5.6	5.6
11141-16-5	Aroclor 1232	ND < 5.6	5.6
53469-21-9	Aroclor 1242	ND < 5.6	5.6
12672-29-6	Aroclor 1248	ND < 5.6	5.6
11097-69-1	Aroclor 1254	ND < 56	56
11096-82-5	Aroclor 1260	ND < 56	56

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 95 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-1-4
AAI RFS #: 93-235-05
AAI Sample #: 9323505-001
DATE SAMPLED: 8/23/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31/93-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	POL
12674-11-2	Aroclor 1016	ND < 6.3	6.3
11104-28-2	Aroclor 1221	ND < 6.3	6.3
11141-16-5	Aroclor 1232	ND < 6.3	6.3
53469-21-9	Aroclor 1242	ND < 6.3	6.3
12672-29-6	Aroclor 1248	ND < 6.3	6.3
11097-69-1	Aroclor 1254	ND < 63	63
11096-82-5	Aroclor 1260	ND < 63	63

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 101 m3
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-3-4
AAI RFS #: 93-235-05
AAI Sample #: 9323505-007
DATE SAMPLED: 8/23/93
DATE RECEIVED: 8/23/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO4(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m3	PQL
12674-11-2	Aroclor 1016	ND < 5.9	5.9
11104-28-2	Aroclor 1221	ND < 5.9	5.9
11141-16-5	Aroclor 1232	ND < 5.9	5.9
53469-21-9	Aroclor 1242	ND < 5.9	5.9
12672-29-6	Aroclor 1248	ND < 5.9	5.9
11097-69-1	Aroclor 1254	ND < 59	59
11096-82-5	Aroclor 1260	ND < 59	59

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 99 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-1-5
AAI RFS #: 93-238-02
AAI Sample #: 93-23802-001
DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 6.1	6.1
11104-28-2	Aroclor 1221	ND < 6.1	6.1
11141-16-5	Aroclor 1232	ND < 6.1	6.1
53469-21-9	Aroclor 1242	ND < 6.1	6.1
12672-29-6	Aroclor 1248	ND < 6.1	6.1
11097-69-1	Aroclor 1254	ND < 61	61
11096-82-5	Aroclor 1260	ND < 61	61

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 109 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-2-5
AAI RFS #: 93-238-02
AAI Sample #: 93-23802-004
DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO4(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.5	5.5
11104-28-2	Aroclor 1221	ND < 5.5	5.5
11141-16-5	Aroclor 1232	ND < 5.5	5.5
53469-21-9	Aroclor 1242	ND < 5.5	5.5
12672-29-6	Aroclor 1248	ND < 5.5	5.5
11097-69-1	Aroclor 1254	ND < 55	55
11096-82-5	Aroclor 1260	ND < 55	55

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 103 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-3-5
AAI RFS #: 93-238-02
AAI Sample #: 93-23802-007
DATE SAMPLED: 8/24/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO4(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.8	5.8
11104-28-2	Aroclor 1221	ND < 5.8	5.8
11141-16-5	Aroclor 1232	ND < 5.8	5.8
53469-21-9	Aroclor 1242	ND < 5.8	5.8
12672-29-6	Aroclor 1248	ND < 5.8	5.8
11097-69-1	Aroclor 1254	ND < 58	58
11096-82-5	Aroclor 1260	ND < 58	58

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 98 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-1-6
AAI RFS #: 93-238-02
AAI Sample #: 93-23802-010
DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 6.1	6.1
11104-28-2	Aroclor 1221	ND < 6.1	6.1
11141-16-5	Aroclor 1232	ND < 6.1	6.1
53469-21-9	Aroclor 1242	ND < 6.1	6.1
12672-29-6	Aroclor 1248	ND < 6.1	6.1
11097-69-1	Aroclor 1254	ND < 61	61
11096-82-5	Aroclor 1260	ND < 61	61

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 103 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-2-6
AAI RFS #: 93-238-02
AAI Sample #: 93-23802-013
DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO4(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.8	5.8
11104-28-2	Aroclor 1221	ND < 5.8	5.8
11141-16-5	Aroclor 1232	ND < 5.8	5.8
53469-21-9	Aroclor 1242	ND < 5.8	5.8
12672-29-6	Aroclor 1248	ND < 5.8	5.8
11097-69-1	Aroclor 1254	ND < 58	58
11096-82-5	Aroclor 1260	ND < 58	58

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 101 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-3-6
AAI RFS #: 93-238-02
AAI Sample #: 93-23802-016
DATE SAMPLED: 8/25/93
DATE RECEIVED: 8/26/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.9	5.9
11104-28-2	Aroclor 1221	ND < 5.9	5.9
11141-16-5	Aroclor 1232	ND < 5.9	5.9
53469-21-9	Aroclor 1242	ND < 5.9	5.9
12672-29-6	Aroclor 1248	ND < 5.9	5.9
11097-69-1	Aroclor 1254	ND < 59	59
11096-82-5	Aroclor 1260	ND < 59	59

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 101 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-1-7
AAI RFS #: 93-239-02
AAI Sample #: 9323902-001
DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-TO4(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.9	5.9
11104-28-2	Aroclor 1221	ND < 5.9	5.9
11141-16-5	Aroclor 1232	ND < 5.9	5.9
53469-21-9	Aroclor 1242	ND < 5.9	5.9
12672-29-6	Aroclor 1248	ND < 5.9	5.9
11097-69-1	Aroclor 1254	ND < 59	59
11096-82-5	Aroclor 1260	ND < 59	59

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 105 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-2-7
AAI RFS #: 93-239-02
AAI Sample #: 9323902-004
DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.7	5.7
11104-28-2	Aroclor 1221	ND < 5.7	5.7
11141-16-5	Aroclor 1232	ND < 5.7	5.7
53469-21-9	Aroclor 1242	ND < 5.7	5.7
12672-29-6	Aroclor 1248	ND < 5.7	5.7
11097-69-1	Aroclor 1254	ND < 57	57
11096-82-5	Aroclor 1260	ND < 57	57

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 101 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: PUF-3-7
AAI RFS #: 93-239-02
AAI Sample #: 9323902-007
DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 5.9	5.9
11104-28-2	Aroclor 1221	ND < 5.9	5.9
11141-16-5	Aroclor 1232	ND < 5.9	5.9
53469-21-9	Aroclor 1242	ND < 5.9	5.9
12672-29-6	Aroclor 1248	ND < 5.9	5.9
11097-69-1	Aroclor 1254	ND < 59	59
11096-82-5	Aroclor 1260	ND < 59	59

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 100 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: TRIP #2 (PUF)
AAI RFS #: 93-239-02
AAI Sample #: 9323902-011
DATE SAMPLED: 8/26/93
DATE RECEIVED: 8/27/93
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 6.0	6.0
11104-28-2	Aroclor 1221	ND < 6.0	6.0
11141-16-5	Aroclor 1232	ND < 6.0	6.0
53469-21-9	Aroclor 1242	ND < 6.0	6.0
12672-29-6	Aroclor 1248	ND < 6.0	6.0
11097-69-1	Aroclor 1254	ND < 60	60
11096-82-5	Aroclor 1260	ND < 60	60

CHLOROBIPHENYLS ANALYSIS

CLIENT NAME: Harding Lawson Associates
PROJECT #: 24246-2.2
PROJECT NAME: Texaco-Walker
MATRIX: PUF Cartridge
AIR VOLUME 100 m³
DILUTION FACTOR: 2.00
EXTRACT FINAL VOL.: 5.00 ml

CLIENT SAMPLE ID: METHOD BLANK
AAI RFS #: 93-235-01
AAI Sample #: Method Blank
DATE SAMPLED: NA
DATE RECEIVED: NA
DATE EXTRACTED: 08/31-09/02/93
DATE ANALYZED: 09/05-07/93
METHOD: EPA-T04(GC/MS)

CAS NUMBER	COMPOUND	CONCENTRATION ng/m ³	PQL
12674-11-2	Aroclor 1016	ND < 6.0	6.0
11104-28-2	Aroclor 1221	ND < 6.0	6.0
11141-16-5	Aroclor 1232	ND < 6.0	6.0
53469-21-9	Aroclor 1242	ND < 6.0	6.0
12672-29-6	Aroclor 1248	ND < 6.0	6.0
11097-69-1	Aroclor 1254	ND < 60	60
11096-82-5	Aroclor 1260	ND < 60	60

QUALITY CONTROL

MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSIS

Page 15

Client : Harding Lawson Associates
 Project Name : Texaco Walker
 Project# : 24246-2.2

Report Date: September 28, 1993
 AAI RFS # : 93-253-01

Parameter	REF I.D.	UNITS	MS RECOVERY	MSD RECOVERY	%RPD	QC LIMITS %REC	RPD
EPA TO-4 Analysis							
Aroclor 1254	PUF BLANK	%	73	78	7.0	70-135	30
Aroclor 1254	PUF BLANK	%	93	104	11	70-135	30
EPA TO-13 Analysis							
Acenaphthene	PUF BLANK	%	59	68	14	50-98	30
Pyrene	PUF BLANK	%	51	54	5.7	50-98	30
Acenaphthene	PUF BLANK	%	59	71	18	50-98	30
Pyrene	PUF BLANK	%	71	74	4.1	50-98	30
Metals Analysis							
Barium	9323501-010	%	55	85	43**	70-135	30
Nickel	9323501-010	%	88	87	1.1	70-135	30
Chromium	9323501-010	%	94	90	4.3	70-135	30
Copper	9323501-010	%	90	88	2.2	70-135	30
Zinc	9323501-010	%	88	92	4.4	70-135	30
Cadmium	9323501-010	%	92	90	2.2	70-135	30
Lead	9323501-010	%	91	87	4.5	70-135	30
Barium	9323902-010	%	105	100	5.0	70-135	30
Nickel	9323902-010	%	90	85	5.7	70-135	30
Chromium	9323902-010	%	80	85	6.0	70-135	30
Copper	9323902-010	%	98	100	2.0	70-135	30
Zinc	9323902-010	%	90	100	11	70-135	30
Cadmium	9323902-010	%	99	100	1.0	70-135	30
Lead	9323902-010	%	91	87	4.5	70-135	30

QUALITY CONTROL

SAMPLE/SAMPLE DUPLICATE ANALYSIS

Page 16

Client : Harding Lawson Associates
 Project Name : Texaco Walker
 Project# : 24246-2.2

Report Date: September 28, 1993
 AAI RFS # : 93-253-01

Parameter	REF I.D.	UNITS	SAMPLE RESULT	DUPLICATE RESULT	%RPD	QC LIMITS RPD
SULFIDES Analysis						
Hydrogen Sulfide	9323501-001	ug/m3	ND<70	ND<70	---	30
Carbonyl Sulfide	9323501-001	ug/m3	ND<130	ND<130	---	30
Methylmercaptan	9323501-001	ug/m3	ND<100	ND<100	---	30
EPA TO-14 Analysis						
Methylene Chloride	9323501-001	ug/m3	12	12	0.0	30
1,1,1-Trichloroethane	9323501-001	ug/m3	17	16	6.1	30
Benzene	9323501-001	ug/m3	20	19	5.1	30
Toluene	9323501-001	ug/m3	93	92	1.1	30
Ethylbenzene	9323501-001	ug/m3	12	12	0.0	30
m,p-Xylene	9323501-001	ug/m3	28	27	3.6	30
o-Xylene	9323501-001	ug/m3	17	17	0.0	30
1,2,4-Trimethylbenzene	9323501-001	ug/m3	19	18	5.4	30
Acetone	9323501-001	ug/m3	67	62	7.8	30
2-Butanone	9323501-001	ug/m3	10	10	0.0	30
1,1,1-Trichloroethane	9323802-003	ug/m3	16	15	6.5	30
Benzene	9323802-003	ug/m3	15	15	0.0	30
Toluene	9323802-003	ug/m3	52	52	0.0	30
Ethylbenzene	9323802-003	ug/m3	7	7	0.0	30
m,p-Xylene	9323802-003	ug/m3	16	15	6.5	30
o-Xylene	9323802-003	ug/m3	9	8	12	30
1,2,4-Trimethylbenzene	9323802-003	ug/m3	8	8	0.0	30
Acetone	9323802-003	ug/m3	49	47	4.2	30
2-Butanone	9323802-003	ug/m3	7	8	13	30
1,1,1-Trichloroethane	9323902-003	ug/m3	17	16	6.1	30
Benzene	9323902-003	ug/m3	15	15	0.0	30
Toluene	9323902-003	ug/m3	56	54	3.6	30
Ethylbenzene	9323902-003	ug/m3	8	8	0.0	30
m,p-Xylene	9323902-003	ug/m3	18	17	5.7	30
o-Xylene	9323902-003	ug/m3	10	10	0.0	30
1,2,4-Trimethylbenzene	9323902-003	ug/m3	10	10	0.0	30
Acetone	9323902-003	ug/m3	41	39	5.0	30
2-Butanone	9323902-003	ug/m3	9	8	12	30

* RPD (Relative Percent Difference) = (MS Result - MSD Result) * 100/average result



ing Lawson Associates
on Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

CHAIN OF CUSTODY FORM

Lab: APOLLO

Job Number: 24246-2,2

Name/Location: TEXACO WALKER

Project Manager: RACHEL MARTINEZ

Samplers: KAREN WITGARD

GREG WRIGHT

Recorder: Yann Hibard

(Signature Required)

SOURCE CODE	MATRIX		#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER	DATE							
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time
64	R-R				0			7	30	820	1910			
											1910			
											1935			
											1935			
											1935			
											1955			
											1955			
											1955			

**STATION DESCRIPTION/
NOTES**

ANALYSIS REQUESTED	
EPA 601/8010	Total Petroil. Hydrocarb.
EPA 602/8020	TO-73 SEM v0.1
EPA 624/8240	TO-4 PC's
EPA 625/8270	TO-14 VOC
Priority Pltn. Metals	SULFIDE S
Benzene/Toluene/Xylene	(A) METALS (Ba, Pb, Cu, Cd, Ni, Zn)

CHAIN OF CUSTODY RECORD

CALL RACIEL MARTINEZ
FOR VERIFICATION OF
METHODS TO BE USED
IF NECESSARY

RELINQUISHED BY: *(Signature)*

Karen Vitasec

RELINQUISHED BY: (Signature)

RELINQUISHED BY: (Signature)

DISPATCHED BY : (Signature)

METHOD OF SHIPMENT

Laboratory Copy
White

Project Office Copy
Yellow

Field or Office Cop
Pink



ing Lawson Associates

31 Sutton Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

CHAIN OF CUSTODY FORM

AAI#932350

Lab: Apollo

Job Number: 24246-2.2

Name/location: TEXACO WALKER

Project Manager: RACHEL MARTINEZ

Samplers: KAREN WITBAARD

GREG WRIGHT AND JUAN FAUSTO

Recorder:

(Signature Required)

STATION DESCRIPTION/ NOTES
PUF-1-3
FF-1-3
JAS-1-3
PUF-2-3
FF-2-3
JAS-2-3
PUF-3-3
FF-3-3
JAS-3-3

CHAIN OF CUSTODY RECORD			
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
Karen Wilhoard 0833 6/23/93	Ruharl	0833	6/23/93
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT			

Texaco Walker

Date	Site	Sample ID	Elapsed Time (min.)	Pressure (in. of H ₂ O)			Sampler Signature	Time off
			On	Off	On	Off		
8/20/93	1	PUPF 1-1	226028	23085.2	59	59	11:20 6W	19:10
8/21/93	1	PUPF 1-2	23085.2	23597.1	58	59	10:07 6W	18:30
8/20/93	2. D _W	PUF 2-1	285300	29459.5	59	59	11:01 6W	19:55
8/21/93	2. D _W	PUP 2-2	29459.5	29532.2	59	58	10:21 6W	18:26
8/20/93	3. D _W	PUF 3-1	28745	29285	55	59	11:00 6W	19:55
8/21/93	3. D _W	PUF 3-2	29285	29814	56	58	10:01 6W/6W	18:40
8/22/93	1	PUF 1-3	23597.5	24113.5	60	58	10:05 6W/6W	18:10
8/22/93	2	PUP 2-3	29532.2	30083	60	57	10:02 6W/6W	18:00
8/22/93	3	PUP 3-3	29814	30334.5	60	56	10:00 6W/6W	18:00



ing Lawson Associates
31 Mission Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

CHAIN OF CUSTODY FORM

Lab: Preco

9323503

Job Number: 24246-2.2

Name/Location: TEXACO GAS STATION

Project Manager: RACHEL MARTINEZ

Samplers: KAREN WITZKE

ANALYSIS REQUESTED

ANALYSIS REQUESTED	
EPA 601/8010	X
EPA 602/8020	X
EPA 624/8240	X
EPA 625/8270	X
Priority Pollnt. Metals	X
Benzene/Toluene/Xylene	X
Total Petrol. Hydrocarb.	X
TB-1 3 SEMI VOL	X
TB-4 PCB'S	X
TB-14 VOC	X
CYANIDES	X
(AD) METALS (Ba, Pb, Cu, Cd, Ni, Zn)	X

LAB NUMBER			DEPTH IN FEET	COL MTD	QA CODE	MISCELLANEOUS	CHAIN OF CUSTODY RECORD			
Yr	Wk	Seq					RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							Karen Witbeck 9/23/93	John W.	8/22/93 18:35	
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT										



Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/562-3297

CHAIN OF CUSTODY FORM

Job Number: 24246 - 2.2

Name/Location: TEXACO - WALKER

Project Manager: RACHEL MARTINEZ

Samplers: JUAN FAUSTO &

SARGN WITBAARD

Recorder: -

Signature Required!

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.	SAMPLE NUMBER OR LAB NUMBER	DATE				
	Water	Sediment	Soil	Oil			Yr	Wk	Seq	Yr	Mo
64	A/R				1		930824	1819			

STATION DESCRIPTION/ NOTES

CHAIN OF CUSTODY RECORD			
RELINQUISHED BY: (Signature) <i>[Signature]</i>	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE/TIME <i>8/26/93 8:45</i>	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT			



ding Lawson Associates
1101 Fulton Centre Drive, Suite 200
Santa Ana, California 92707
4/556-7992 - 213/617-7232
FAX: 714/662-3297

CHAIN OF CUSTODY FORM

Lab: APOLLO

Job Number: 24244-2.2

Name/Location: TEXACO - WALKER

Project Manager: RACHEL MARTINEZ

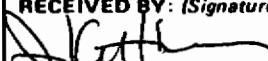
Samplers: JUAN FAUSTO &
GREG WRIGHT

Recorder: —

STATION DESCRIPTION/ NOTES
PUF - 1 - 6
FF - 1 - 6
IAS - 1 - 6
PUF - 2 - 6
FF - 2 - 6
IAS - 2 - 6
PUF - 3 - 6
FF - 3 - 6
IAS - 3 - 6

DPS# 9323802

CHAIN OF CUSTODY RECORD

1 1/26/93 8:45	RECEIVED BY: (Signature) 	DATE/TIME 8/26/93 8:44
2)	RECEIVED BY: (Signature)	DATE/TIME
3)	RECEIVED BY: (Signature)	DATE/TIME
4)	RECEIVED BY: (Signature)	DATE/TIME
	RECEIVED FOR LAB BY: (Signature)	DATE/TIME



Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

CHAIN OF CUSTODY FORM

Job Number: 24246-2.2

Name/Location: TEXACO - WALKER

Project Manager: RACHEL MARTINEZ Recorder:

Samplers: JUAN PAUSTO, KAREN
WITBAGG

Lab: 170 220

9323902

STATION DESCRIPTION/
NOTES

PUF-1-7
FF-1-7
IAS-1-7
PUF-2-7
FF-2-7
IAS-2-7
PUF-3-7
FF-3-7
IAS-3-7
TRIP #2 (FP)

CHAIN OF CUSTODY RECORD			
RELINQUISHED BY: (Signature) <i>Lease</i>	RECEIVED BY: (Signature) <i>Rubin</i>	DATE/TIME 8/27/93 12:20	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT			

Texaco Walker
24246 2

PUF SAMPLER DATA



Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707
714/556-7992 - 213/617-7232
FAX: 714/662-3297

CHAIN OF CUSTODY FORM

Lab. APOLLO

Job Number: 24246-2,2

Name/Location: TEXACO - WALKER

Project Manager: RACHEL MARTINEZ

Samplers: JUAN PAUSTO &
FREE WRIGHT

Recorder: Jane
(Signature Required)

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS	PFS# 9223903- CHAIN OF CUSTODY RECORD			
Yr	Wk	Seq					RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							<i>Janso</i>	<i>LM</i>	8/27/93 18:05	
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT										



PHONE (714) 751-3210 FAX (714) 751-6414
2960 AIRWAY AVENUE, SUITE B-101 COSTA MESA, CALIFORNIA 92626

AAI RFS# : 93-235-01,etc.

November 2, 1993

Harding Lawson Associates
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

Project Name: Texaco Walker
Project # : 24246-2.2

Attention: Tom Harder

Enclosed are the surrogate recovery summary reports from the analysis of volatile organics by EPA TO-14, semi-volatile organics by EPA TO-13, and polychlorinated biphenyls by EPA TO-4, for the Texaco Walker site. Per our conversation, the methodology for the analysis of metals and sulfur compounds did not call for surrogate recovery information, therefore, we have no surrogate data to report for these analyses.

If you have any questions, please feel free to call me at (714) 751-3210.



Leon Levan
Laboratory Manager

SURROGATE RECOVERY: VOLATILE ORGANICS BY EPA TO-14

AAI RFS #: 93-239-03, etc.

Client Name: Harding Lawson
 Project #: 24246-2.2
 Project Name: Texaco-Walker
 Matrix: Air- Tedlar Bags

Date(s) Sampled: 8/20-27/93
 Date Received: 8/23-27/93
 Date(s) Analyzed: 8/23-28/93
 Analysis Method: EPA TO-14

AAI ID		1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene
NUMBER	CLIENT ID	(% Recovery)	(% Recovery)	(% Recovery)
9323501-003	IAS-1-1	114	107	101
9323501-009	IAS-3-1	105	108	99
9323501-014	IAS-1-2	103	107	97
9323501-017	IAS-2-2	104	108	97
9323501-020	IAS-3-2	103	108	96
9323501-023	IAS-1-3	103	109	95
9323501-026	IAS-2-3	109	108	97
9323501-029	IAS-3-3	107	108	97
9323505-003	IAS-1-4	109	108	98
9323505-006	IAS-2-4	113	108	98
9323505-009	IAS-3-4	108	108	96
9323802-003	IAS-1-5	124	101	104
9323802-006	IAS-2-5	116	101	102
9323802-009	IAS-3-5	113	101	101
9323802-012	IAS-1-6	115	102	99
9323802-015	IAS-2-6	112	103	99
9323802-018	IAS-3-6	107	105	98
9323902-003	IAS-1-7	100	105	97
9323902-006	IAS-2-7	98	107	95
9323902-009	IAS-3-7	101	106	96
9323903-001	IAS-1-8	97	107	96
9323903-002	IAS-2-8	100	108	95
9323903-003	IAS-3-8	102	108	96
Method Blank 1	----	105	108	99
Method Blank 2	----	105	108	99
Method Blank 3	----	98	104	98
Method Blank 4	----	96	105	98
<i>Quality Control Limits</i>		80%-125%	80%-125%	80%-125%

Note: QC limits adapted from " Draft EPA CLPSOW For the Analysis of Ambient Air" , Rev IAI, Vol 2.

SURROGATE RECOVERY: SEMI-VOLATILE ORGANICS BY EPA TO-13

AAI RFS #: 93-239-03, etc.

Client Name: Harding Lawson
 Project #: 24246-2.2
 Project Name: Texaco-Walker
 Matrix: Air- PUF Cartridge

Date(s) Sampled: 8/20-27/93
 Date Received: 8/23-27/93
 Date(s) Analyzed: 8/23-28/93
 Analysis Method: EPA TO-13

AAI ID		Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
NUMBER	CLIENT ID	(% Recovery)	(% Recovery)	(% Recovery)
9323501-001	PUF-1-1	19	60	65
9323501-004	PUF-2-1	50	69	69
9323501-007	PUF-3-1	20	69	91
9323501-012	PUF-1-2	56	70	75
9323501-015	PUF-2-2	53	69	70
9323501-018	PUF-3-2	55	75	81
9323501-021	PUF-1-3	55	73	85
9323501-024	PUF-2-3	58	74	92
9323501-028	PUF-3-3	54	69	76
9323505-001	PUF-1-4	26	40	60
9323505-004	PUF-2-4	58	75	83
9323505-007	PUF-3-4	75	100	122
9323802-001	PUF-1-5	13	63	92
9323802-004	PUF-2-5	57	76	90
9323802-007	PUF-3-5	66	83	97
9323802-010	PUF-1-6	60	78	94
9323802-013	PUF-2-6	12	23	68
9323802-016	PUF-3-6	64	82	102
9323902-001	PUF-1-7	59	77	87
9323902-004	PUF-2-7	54	67	73
9323902-007	PUF-3-7	52	69	76
9323902-011	TRIP #2 (PUF)	55	74	97
9323501-011	TRIP #1 (PUF)	52	67	82
Method Blank 1	-----	16	26	64
Method Blank 2	-----	55	72	85
Method Blank 3	-----	57	70	93

Quality Control Limits

10%-125%

20%-125%

25%-125%

Note: QC limits adapted from " Draft EPA CLPSOW For the Analysis of Ambient Air" , Rev IAI, Vol 2.

SURROGATE RECOVERY: POLYCHLORINATED BIPHENYLS BY EPA TO-4**AAI RFS #: 93-239-03, etc.**

Client Name: Harding Lawson
Project #: 24246-2.2
Project Name: Texaco-Walker
Matrix: Air- PUF Cartridge

Date(s) Sampled: 8/20-27/93
Date Received: 8/23-27/93
Date(s) Analyzed: 8/23-28/93
Analysis Method: EPA TO-4

AAI ID**2,4,5,6-Tetrachloro-m-xylene**

NUMBER	CLIENT ID	(% Recovery)
9323501-001	PUF-1-1	88
9323501-004	PUF-2-1	91
9323501-007	PUF-3-1	97
9323501-012	PUF-1-2	84
9323501-015	PUF-2-2	86
9323501-018	PUF-3-2	91
9323501-021	PUF-1-3	102
9323501-024	PUF-2-3	93
9323501-028	PUF-3-3	81
9323505-001	PUF-1-4	47
9323505-004	PUF-2-4	92
9323505-007	PUF-3-4	107
9323802-001	PUF-1-5	88
9323802-004	PUF-2-5	96
9323802-007	PUF-3-5	104
9323802-010	PUF-1-6	89
9323802-013	PUF-2-6	20
9323802-016	PUF-3-6	104
9323902-001	PUF-1-7	91
9323902-004	PUF-2-7	87
9323902-007	PUF-3-7	85
9323902-011	TRIP #2 (PUF)	106
9323501-011	TRIP #1 (PUF)	95
Method Blank 1	----	41
Method Blank 2	----	107
Method Blank 3	----	100

Quality Control Limits**40%-125%**

Note: QC limits adapted from " Draft EPA CLPSOW For the Analysis of Ambient Air" , Rev IAI, Vol 2.

APPENDIX H

APPENDIX H
ANALYTICAL DATA VALIDATION

APPENDIX H

ANALYTICAL DATA VALIDATION

INTRODUCTION

At the conclusion of Harding Lawson Associates' (HLA) data validation, an evaluation of the Walker Property Site (Site) soil and groundwater data quality was prepared with respect to the U.S. Environmental Protection Agency's (EPA) established data quality indicators, which include accuracy, precision, representativeness, completeness, and comparability. These criteria are defined in the guidance document *Data Quality Objectives for Remedial Response Activities* (EPA, 1987). The evaluation of the Site's waste classification data with respect to these parameters involved a review of relevant project and laboratory quality assurance/quality control (QA/QC) results, and the overall design and implementation of the Site sampling and analytical program.

The data quality objective (DQO) of the sampling analysis plan was to generate sufficient data to adequately characterize subsurface conditions at the Site and the nature and extent of elevated concentrations of chemicals. The QA/QC data of soil and groundwater samples collected during the remedial investigation were evaluated to determine whether the sample results were of acceptable quality to meet the DQO.

Based on the data validation, affected sample results were qualified by the addition of letters to indicate the nature of the qualification. Sample results that were determined to be estimated were qualified with a "J" for detected compounds and a "U" for nondetected compounds. If a compound was present in the method blank, the corresponding sample result was qualified with a "B" to indicate that this sample result was estimated because of contamination of the blank. Sample results that were determined to be unusable were qualified with an "R" to indicate rejection.

Soil samples were analyzed by BC Analytical (BCA), a State-certified laboratory using EPA-approved methods. Methods for organic analyses for which soil QA/QC data were reviewed included:

- EPA Method 410.1 (total organic carbon),
- EPA Method 418.1 (total recoverable petroleum hydrocarbons),
- EPA Method 8015 modified (total petroleum hydrocarbons as gasoline and diesel),

- EPA Method 8080 (organochlorine pesticides and polychlorinated biphenyls),
- EPA Method 8260 (volatile organic compounds), and
- EPA Method 8270 (semi-volatile organic compounds).

The method for inorganic analysis for which soil QA/QC data were reviewed was:

- EPA Method 6010 (metal analyses including barium and lead).

Methods for organic analyses for which groundwater QA/QC data were reviewed included:

- EPA Method 418.1 (total recoverable petroleum hydrocarbons),
- EPA Method 8015 modified (total petroleum hydrocarbons as gasoline and diesel), and
- EPA Method 8260 (volatile organic compounds).

Methods for inorganic analyses for which groundwater QA/QC data were reviewed included:

- EPA Method 310.1 (alkalinity),
- EPA Method 325.3 (chloride),
- EPA Method 340.2 (fluoride),
- EPA Method 353.2 (nitrate),
- EPA Method 375.4 (sulfate),
- EPA Method 6010 (metal analyses including aluminum, calcium, copper, iron, magnesium, manganese, potassium, sodium, and zinc), and
- EPA Method 9040 (pH).

Based on a review of the QA/QC data, the overall accuracy, precision, representativeness, completeness, and comparability of the Site analytical data are acceptable relative to the project DQO. The following summarizes the review of the QA/QC data.

ACCURACY

Accuracy represents a measure of the nearness of the analytical result to its actual concentration. To assess accuracy for the different analytical methods, QC samples (matrix spikes/matrix spike duplicates [MS/MSD]) were spiked at the laboratory with known concentrations of target compounds. For EPA Test Methods 8080, 8260, and 8270, investigative samples were also spiked at the laboratory with surrogate compounds. Surrogate compounds are target compounds that are similar to target analytes in chemical composition and behavior but which are not normally found in environmental samples. The accuracy of an analytical data set is assessed by calculating the percent recovery (PR) of the spiked surrogate compound in investigative samples and of the spiked target analytes in MS/MSD samples and comparing calculated PRs to established acceptance limits.

Acceptance limits for the PRs should be set by the laboratory by calculating the average PR and its standard deviation using the last thirty matrix spikes that were analyzed (EPA, 1986). The acceptance limits (control limits) are calculated using the following formulas:

$$\text{Upper control limit} = \text{average PR} + 3 * (\text{standard deviation})$$

$$\text{Lower control limit} = \text{average PR} - 3 * (\text{standard deviation})$$

In addition to using the laboratory's matrix spike limits, QC limits from the EPA's *Contract Laboratory Program (CLP) Statement of Work for Organics Analysis* and *Statement of Work for Inorganics Analysis* (1988b, 1988a) were also applied for evaluation of the data. When these limits were not specified, limits were based on professional judgement and historical accuracy data presented in EPA-approved methods and in the EPA guidance document *Data Quality Objectives for Remedial Response Activities* (EPA, 1987).

For the organic methods used in the Site analytical program, MS/MSD analyses were performed for a minimum of 15 percent of the investigative samples collected. This is in compliance with EPA guidelines, which advise an analysis frequency of 5 percent for project QA/QC samples.

The criteria for evaluating MS/MSD results for the project are summarized in Table H1. The MS/MSD results for EPA Methods 418.1, 8080, 8260, and 6010 metals were of acceptable accuracy.

For EPA Method 8015 modified analyses, MS/MSD PRs were outside acceptance limits for one report. Data from this report were not qualified because all other QC data were within acceptance limits. For EPA Method 8270 analyses, MS/MSD PRs were outside acceptance limits for one or more constituents in two reports. Results for all analytes from all samples collected from borings LS-5, LS-7, and LS-8 were qualified as estimated based on the MS/MSD results as well as other QC data that were outside acceptance limits. Detected results were qualified with a "J" and nondetect results were qualified with a "UJ."

Surrogate spike criteria for the project are summarized in Table H2. The surrogate PRs for two samples analyzed using EPA Method 8080 were below acceptance limits. Because all other QC data were within limits, the data were not qualified. The surrogate PRs for toluene D8 were low for three samples and the PRs for bromofluorobenzene were high for two samples, all from the same report. Because all other QC data were within limits, the data were not qualified. The surrogate PRs for more than one surrogate were outside acceptance limits for three samples (RS17 at 5 feet, RS8 at 5 feet, and LS1 at 1 foot). Because other QC data were also outside acceptance limits, these samples were qualified as estimated.

Based on a review of the MS/MSD and surrogate spike data, the overall accuracy of the Site analytical data appears acceptable relative to the project DQO. Data from soil samples collected from Borings LS-5, LS-7, and LS-8 are not as accurate based on MS/MSD and other QC data.

PRECISION

Precision is a measure of the reproducibility of a set of analytical results, or a measured of how closely results from duplicate samples compare with each other. The precision of the Site analytical data was assessed through an evaluation of the relative percent difference (RPD) values calculated for MS/MSD samples and field duplicates.

$$RPD = \frac{|MS_{result} - MSD_{result}|}{\left(\frac{MS_{result} + MSD_{result}}{2} \right)} \times 100$$

QC limits its laboratory matrix spike RPDs were provided by BCA.

For concentrations close to the detection limits, the uncertainty in the measurements is statistically large. Based on professional experience and technical judgement, duplicate results near the detection limits were compared to ensure that they were both within approximately 5 times the detection limit.

For EPA Methods 418.1, 8080, 8260, and 6010 metals, the MS/MSD RPDs for soil analytical results were within acceptance limits. The RPDs were outside acceptance limits for one EPA Method 8015 modified and two EPA Method 8270 soil analytical reports. No EPA Method 8015 modified soil data were qualified because other QC data were within acceptance limits. The MS/MSD RPD data for one report were used as support to qualify EPA Method 8270 data for soil samples from Borings LS-5, LS-7, and LS-8.

The RPDs for groundwater results from samples collected on September 14, 1993, were high for one or more constituents for EPA Methods 325.3, 375.4, 8015 modified, and 8260. Groundwater RPDs for analytical results from samples collected on November 9, 1993, were acceptable for all EPA methods.

Based on a review of the MS/MSD RPDs, the overall precision of the Walker Site soil analytical data appears acceptable relative to project DQO. The groundwater data for EPA Methods 325.3, 375.4, 8015 modified, and 8260, collected on September 14, 1993, may not be as precise as data for the same analytical methods collected on November 9, 1993.

REPRESENTATIVENESS

Representativeness refers to how well sample data accurately and precisely reflect the true environmental conditions of a site. Factors that may affect sample representativeness include: (1) the locations of sampling sites and the frequency of sampling, (2) sample collection procedures, and (3) compromises to sample integrity (e.g., cross contamination) occurring during collection, transport, and analysis of the samples. Selection of representative sampling sites is important to ensure that the medium sampled is typical of site conditions. Correct sample collection, transport, and analytical procedures are important to ensure that the samples closely resemble the medium sampled, and the introduction of contaminants into the samples is minimized.

Sample locations, sample frequency, and sample collection protocols applied in the Site program were described in the Workplan. These protocols follow standard, accepted methods of site characterization and sample collection and were consistently applied by HLA throughout the RI field program. Thus, with respect to accepted site characterization approaches, existing guidance, and regulatory compliance, HLA's confirmation boring sampling program at the Site appears to have met relevant requirements for data representativeness.

Sample representativeness and integrity are typically assessed by the collection and/or analysis of sampling equipment and laboratory (i.e., method) blank samples. Equipment blanks for groundwater sampling consist of deionized water rinsate collected from the decontaminated sampling equipment. The rinsate sample was labeled and submitted blind to BCA to be analyzed for volatile organics using EPA Method 8260. No EPA Method 8260 analytes were detected in any of the equipment blanks collected during the Site remedial investigation, indicating that field decontamination procedures were adequate. Soil equipment blanks are not generally collected because there is no universal matrix for soil samples. Method blank samples were clean matrix samples (i.e., distilled/deionized water) generated and analyzed by BCA as part of its internal QA program.

Some of the method blank results supplied by BCA for EPA Method 8260 analyses contained methylene chloride. Based on these results, two analytical results for methylene chloride were qualified with a "B" to indicate the presence of that constituent in the associated blank.

The overall representativeness of the Site analytical data appears acceptable relative to project DQO. Analytical results qualified with a "B" are of a more estimated nature.

COMPLETENESS

Completeness is defined as the percentage of analytical results that are considered to be valid. Valid chemical data are values that have been identified during the data validation process as "acceptable" or "acceptable as qualified". Analytical results qualified with an "R" are considered unusable and are not valid results. Analytical results may be qualified unusable for a variety of reasons, such as analytical or QA/QC problems, severe sample holding time violations, or interferences resulting from a complex sample matrix.

To determine if a sample was analyzed within the holding time specified by the analytical method, the number of days elapsed between sample collection and sample analysis (or extraction, if applicable) was calculated. If holding time violations were not severe, results were considered to be estimated values.

Soil EPA Method 8270 samples from five reports were not analyzed within the holding time for extraction. Samples that were extracted more than a day past the holding time were qualified as estimated. Soil EPA Method 8080 samples from one report were not analyzed within the holding time for extraction. All sample results from that report were qualified as estimated. None of the EPA Method 8270 or 8080 data were rejected based on holding time violations because the analytes being analyzed for

are semivolatile and, if present in samples, are not likely to degrade significantly over the amount of time represented by the holding time violations.

Because none of the Site remedial investigation data were rejected, the analytical program has achieved 100 percent completeness, which satisfies the requirements of the DQO.

COMPARABILITY

Comparability is a qualitative assessment of how well one set or round of analytical data compares to another. Important factors that determine comparability of data sets include uniformity of sampling activities, analytical procedures, reporting of results, and validation of results.

Sampling techniques, analytical parameters and methods, and reporting of results have remained highly consistent throughout the Site remedial investigation program. HLA has also performed a single validation of the Site remedial investigation database, and as a result, criteria for qualification have been applied uniformly to all rounds of data. The fact that none of the data were rejected lends a high degree of comparability to the Site remedial investigation analytical results.

BIBLIOGRAPHY

- U.S. Environmental Protection Agency, 1986, Test methods for evaluating solid waste. V. 1B, laboratory manual for physical/chemical methods, November.
- 1987. Data quality objectives for remedial response activities; EPA/540/G-87/002, March.
- 1988b. Contract laboratory program statement of work for organics analysis, Document Number OLM01.0.
- 1988d. Laboratory data validation functional guidelines for evaluating organic analyses, July 1.

TABLE H1. TRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) CRITERIA
Walker Property, Remedial Investigation
Santa Fe Springs, California

Test Method	Percent Recovery (PR) Control Limits (%)				Relative Percent Difference (RPD) Control Limits (%)	Comments
	Soil	Water	Soil	Water		
418.1		19-153	34-129	30	30	All soil and groundwater MS/MSD data are within acceptance limits. No impact on data quality is anticipated. Limits based on professional judgement and on historical accuracy and precision data presented in EPA-approved methods.
8015 Modified		35-148	53-128	34	30	The MS/MSD PR and RPD were low for one soil report. Because all other QC data were within acceptance limits, no impact on data quality as anticipated. Limits based on professional judgement and on historical accuracy and precision data presented in EPA-approved methods.
8080	Aroclor 1254	29-131	NA	46	NA	All soil MS/MSD data are within acceptance limits. No impact on data quality is anticipated. Limits based on professional judgement and on historical accuracy and precision data presented in EPA-approved methods.
8260	1,1-Dichloroethene Trichloroethene Benzene Toluene Chlorobenzene	59-172 62-137 66-142 59-139 60-133	61-145 71-120 76-127 76-125 75-130	22 24 21 21 21	14 14 11 13 13	All soil and groundwater MS/MSD data are within acceptance limits. No impact on data quality is anticipated. Control limits from Organics SOW.
8270	1,4-Dichlorobenzene N-Nitrosodi-n-propylamine 1,2,4-Trichlorobenzene Acenaphthene 2,4-Dinitrotoluene Pyrene 2-Chlorophenol Phenol 4-Chloro-3-methylphenol Pentachlorophenol 4-Nitrophenol	28-104 41-126 38-107 31-137 28-89 35-142 25-102 26-90 26-103 17-109 11-114	36-97 41-116 39-98 46-118 24-96 26-127 27-123 12-110 23-97 9-103 10-80	27 38 23 19 47 36 50 35 33 47 50	28 38 28 31 38 31 40 42 42 50 50	PRs were above the acceptance limit for phenol and 2,4 dinitrotoluene on one soil report and below the acceptance limit for 2,4 dinitrotoluene on another soil report. RPDs were above the acceptance limit for 2,4 dinitrotoluene on one soil report and pentachlorophenol on another soil report. All soil analyses from Borings LS-5, LS-7, and LS-8 were qualified as estimated (UJ) based on MS/MSD and additional QC data that were also outside acceptance limits. Control limits from Organics SOW.

TABLE H1. TRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) CRITERIA

Walker Property, Remedial Investigation

Santa Fe Springs, California

(continued)



Test Method	Percent Recovery (PR) Control Limits (%)		Relative Percent Difference (RPD) Control Limits(%)		Comments	
	Soil	Water	Soil	Water		
Metals	Aluminum	75-125	75-125	35	20	All soil and groundwater MS/MSD data are within acceptance limits. No impact on data quality is anticipated. Control limits from Inorganics SOW.
	Calcium	75-125	75-125	35	20	
	Copper	75-125	75-125	35	20	
	Iron	75-125	75-125	35	20	
	Magnesium	75-125	75-125	35	20	
	Manganese	75-125	75-125	35	20	
	Potassium	75-125	75-125	35	20	
	Sodium	75-125	75-125	35	20	
	Zinc	75-125	75-125	35	20	

Notes: Organics SOW = EPA Contract Laboratory Program Statement of Work for Organics Analysis, 1988.

Inorganics SOW = EPA Contract Laboratory Program Statement of Work for Inorganics Analysis, 1988.

NA = Not Available

TABLE SURROGATE SPIKE CRITERIA
Walker Property, Remedial Investigation
Santa Fe Springs, California

Test Method	PR Control Limits	Soil	Water	Comments
8080	Decachlorobiphenyl	60-150	60-150	Surrogate recoveries for two soil sample results were below acceptance limits. Because all other QC data were within acceptance limits, the sample results are considered acceptable. Control limits from Organics SOW.
8260	Dibromofluoromethane Toluene-d8 Bromofluorobenzene	70-121 84-138 59-113	76-114 88-110 86-115	The surrogate recovery for toluene d8 was below acceptance limits for three soil samples. The surrogate recovery for bromofluorobenzene was above acceptance limits for two soil samples. Because other QC data were within limits, the sample results are considered acceptable. Control limits from Organics SOW.
8270	Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol 2-Chlorophenol-d4 1,2-Dichlorobenzene-d4	23-120 30-115 18-137 24-113 25-121 19-122 20-130 20-130	35-114 43-116 33-141 10-110 21-110 10-123 33-110 16-110	Three soil samples were qualified as estimated (UJ) because surrogate recoveries were outside acceptance limits for more than one surrogate for those samples, and because other QC data from the same reports were also outside acceptance limits. Control limits from Organics SOW.

Notes:

Organics SOW = EPA Contract Laboratory Program Statement of Work for Organics Analysis, 1988.